Università degli Studi di Sassari

Dipartimento di Architettura Design e Urbanistica – Alghero

Dottorato in Architettura e Ambiente

XXIX Ciclo

Planning, Managing and Empowering while Pursuing Change: Exploring the Integration of People Map-Making and Geographic Information Technologies

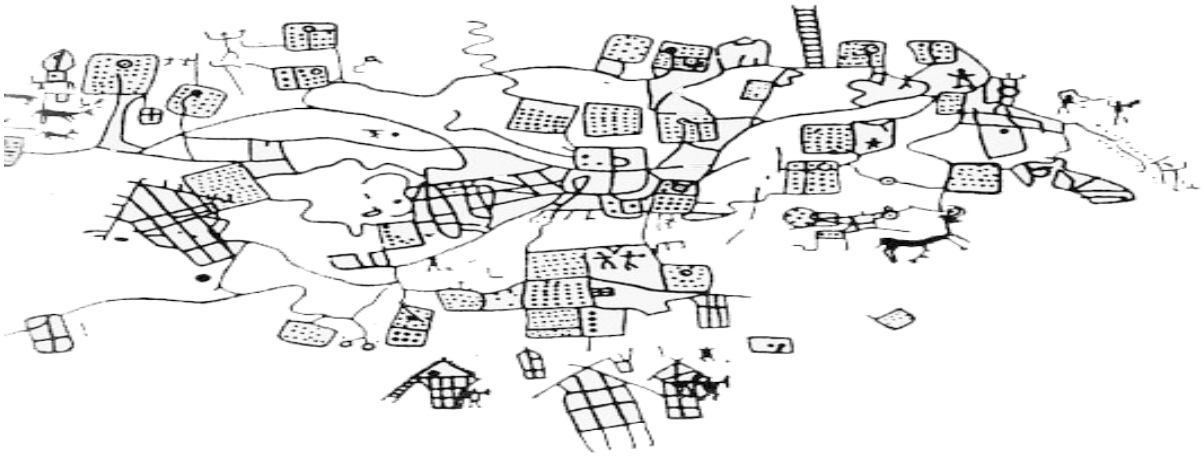
Relatori:

Arnaldo Cecchini

Loredana Tedeschi

Tesi di Dottorato di:

Barbara Dovarch



Università degli Studi di Sassari

Corso di Dottorato di ricerca in

Architettura e Ambiente

La presente tesi è stata prodotta durante la frequenza del corso di dottorato in Architettura e Ambiente dell'Università degli Studi di Sassari, a.a. 2013/2016 - XXIX ciclo, con il sostegno di una borsa di studio cofinanziata con le risorse del P.O.R. SARDEGNA F.S.E. 2007-2013 - Obiettivo competitività regionale e occupazione, Asse IV Capitale umano, Linea di Attività l.3.1 "Finanziamento di corsi di dottorato finalizzati alla formazione di capitale umano altamente specializzato, in particolare per i settori dell'ICT, delle nanotecnologie e delle biotecnologie, dell'energia e dello sviluppo sostenibile, dell'agroalimentare e dei materiali tradizionali".

La tesi è stata prodotta, altresì, grazie al contributo della Fondazione di Sardegna.

Table of contents

-Table of contents **v**

-Abstract **vii**

-Introduction **viii**

-Part One – Transformative Participation **1**

Setting the Scene | Insurgent Practices | International debate on participatory practices in development | Space on the Everyday | Exploring contexts through co-production of knowledge

-Part Two – People Map-Making as a Transformative Practice **10**

Mapping with People | Space, Scale and Time | Origins of people mapping | Mapping experiences in Asia | Why GIS

-Part Three – Participatory 2D Mapping in Vietnam and Philippines **22**

Vietnam - The Picture | Background | Working with Rural Communities | Mapping process | Philippines - The picture | Background | Mapping to be Taken Seriously | Professionals and not professional Experts

-Part Four – Approaching Geographic Information technologies **27**

Reflecting on the ground work | Experimenting the digitization of people's paper maps | Participatory GIS | Volunteered Geographic Information | Participatory GIS debate | Participatory 3D Modelling

-Part Five – Participatory 3D Modelling in Samoa **51**

The picture | Background | Mobilisation and Community Attitude Change | Model Construction and Perspective Change | Mutual learning and model custody | P3DM processes under the Small Grant Programme | Relational, procedural and structural changes | An important precedent

-Part Six – Participatory 3D Modelling in Nauru **65**

The picture | Background | The P3DM workshop | Reflecting together on Nauruan social context | The 'green' topside | The potential of P3DM in Nauru | Next possible steps

-Part Seven – Valuing Integrating and Enabling **77**

The Transformative Capacities of Mapping | People Map/Model Making + GIS (PM+GIS) | Enabling People Mapping Practice

Conclusions and Prospects **103**

Appendix **108**

Bibliography **121**

Abstract

This research work is an exploration of practices for local inhabitants' involvement within urban/rural planning processes and environmental management.

A particular focus is placed on People Mapping, a hands-on practice in which people represent their own place of living on maps or relief models according to their local knowledge, everyday experience and sense of belonging. Geographic Information Technologies are here analysed as an added value to People Mapping, to make its outcomes more communicative, authoritative and, in particular, reusable as a base to build upon by planners. In fact, mapping is conceived as a means to put into constructive dialogue government authorities, professionals, and inhabitants conceived as local experts. In this sense, the process of map/model making is here considered a transformative practice. Through revealing the contextual social production of places, its identity and its representation in locals' perspective; as well as tailoring alternatives, and liberating imaginaries; people enhance their agency and capacity to challenge institutionalized modes and contest dominant conceptions. The interaction among different stakeholders who can voice their positions and visions; the possibility of interweaving new power relationships and the co-production of a unique knowledge embodied in a visual device made of optimized data and information, lay essential foundations for more concerted development approaches and practices and consequently more just changes in space production and resources management.

Introduction

Planning and environmental management within urban and rural development often fail to embrace a meaningful involvement of local inhabitants. The idea which inspires this research work is that a narrative of spaces embedded in local knowledge naturally exists and that people are experts of their own living places. This work, in fact, is characterized by a sociological perspective on space transformation. A way to conceive spaces and related processes as continuously socially produced and reproduced by dwellers; shaped by their uses, values, attribution of meanings and relations they interweave in daily life. People Mapping, a participatory practice in which people represent their own living places on maps or relief models, has been chosen among the multitude of participatory methods within development practice as it perfectly embodies the dialectic ratio between the physical and the social in regard to space. It is a dialogical method of realities' representation, adaptable to different contexts, conditions and purposes; it provides for equal positions of participants and active modality of involvement. It permits to capture record and optimize data and information; it is a flexible 'living' tool allowing continuous updating and support.

Mapping is both a participatory process and a participatory product. However, while its capacity as a process is widely demonstrated, its efficacy as 'product' is still debated and this is what this research work explores. Indeed, a critical reflection on the capacity of mapping to enhance people agency in space transformation and resource management, is complemented by the examination of possible modes of integration between People Mapping and Geographic Information Technologies. This integration has in fact the potential to make mapping as 'participatory products' more authoritative, communicative and in particular re-usable within planning circles. Differently from the majority of studies and methodologies developed within Participatory Geographic Information Systems (PGIS), in which the general goal is to make geographic information technical tools in various ways more 'participatory', this work centre on people mapping processes and approach Geographical Information Systems as an added value to the collective practice, without interfering with the face-to-face modality, but contributing to improve efficacy of its already fruitful outcomes.

The denomination of 'people map-making' is a choice in this work. It is preferred to the much more common 'community mapping' for two main reasons: firstly, as 'community' is normally an administrative term and its definition changes consistently depending on specific contexts, while 'people' refers immediately to the human and social dimension that is key in this research. Secondly, the term 'map-making' wants to underline the hands-on approach explored, based on collective manufacturing of maps or models by local people.
It might be useful for the reader to know that, when used in this text, 'community' refers to a group of people belonging to the same village or neighbourhood which work together with a common objective, and 'mapping' is conceived as mapping using either paper maps or three dimensional physical models.

Participatory Mapping, with its numerous approaches and technical tools, has been widely applied both in the North and in the South in the last decades. However, in this research work a particular focus is placed on people mapping practices developed in developing countries. The argument, in fact, is grounded and analysed through personal practical experiences in four different contexts in Vietnam, Philippines, Western Samoa and Nauru. The analysis of the related fieldworks illustrates the potentials and limitations of different people mapping methods ranging from 2D map-making to 3D model-making (specifically Participatory 3D Modelling).

The work is organized as following: Part One is an overview of the literature about participatory development and related international debate. In Part 2, people mapping practice is explored from its origin and described through a series of case studies in Asia. Part 3 is about a personal six months fieldwork on 2D scale map-making carried out in 2013 in central Vietnam concerning a process of community-led drainage planning. Also, in the same part it is described a workshop in Philippines where 2D scale mapping was used for onsite reblocking plan aimed at urban upgrading and settlement consolidation. Part 4 contains the report of a personal experiment of digitizing Vietnam people's maps on GIS; then, an overview of the literature regarding worldwide practices of Participatory GIS and Volunteer Geographic Information (VGI); and, to conclude, an explanation of what Participatory 3D Modelling (P3DM) is and how it is adopted worldwide. Part 5 is about a three months fieldwork in Samoa in 2016. Specifically, this was a participatory evaluation carried out with local communities on P3DM practice which has been largely adopted in the country since 2012. Similarly, Part 6 is

dedicated to Nauru, a small Pacific island which is facing a very tough historical moment both in social and environmental terms. A P3DM workshop was held in April 2016 in the island, and this part includes a report of personal observation and relative reflection on the model's construction process. The critical reflection on practice brings to Part 7 articulated in three sections. The first, in which six fundamental Transformative Capacities of Mapping to pursue three interrelated dimensions of change are delineated; the second where an idea of integration of People Map/Model-Making and Geographic Information Systems (GIS) is defined; and finally the third, in which a series of guiding principles addressed to development practitioners working within this kind of processes are outlined.
In the conclusions, an idea of possible implementation of People Mapping + GIS through the creation of an international action learning platform is drawn for future developments.

Part One

Transformative Participation

'For every plan there is a non-plan,
for every net, there's a contra-net.
The uncontrolled areas are essential places in life
and need not to be known, but understood."
Scene from Andrei Tarkovsky's movie Stalker (1979)

Setting the scene

Massive and uncontrolled growth of urban population in contemporary cities, impacts at local level of global development trends, unrestrained exploitation of natural resources, overall exposure to environmental hazards. Urban and rural contexts have become complex terrains of multiplicity and diversity where global economy assumes localized forms and spaces result continuously contested among pressing interests and daily exigencies, generating contradictions and conflicts. The population of the poor sharply increases and new geographies of centrality and marginality emerge (Sassen, 2000). Disadvantaged or problematic areas are very diverse depending on specific contexts, generally characterized by high vulnerability, in both social and environmental terms, lack of entitlements and limitation in terms of social opportunities (Wratten, 1995). Some of these challenging contexts are dense informal settlements –often invisible on the official cartography- where the poor spontaneously build their shelters in precarious legal condition without basic services and proper infrastructures (Huchzermeyer & Karam, 2007). Some are peri-urban areas in search of consolidation which encompass the flexible edges of urban expansion. Other are rural contexts dealing with natural resources' management where people struggle for preserving their environment after decades of unconscious human misuse. Meanwhile, climate change is more than ever globally impacting local contexts, affecting already fragile eco-systems and biodiversity. In this realm, it seems key a more responsible approach which entails active engagement both of inhabitants and local authorities, a way to think and operate collectively while enabling concerted processes for space transformation aimed at social and structural change.

Insurgent practices

Generally, it is widely recognized that participation of locals in processes of planning or resource management can produce more responsive outcomes and socio-institutional benefits; in addition to the fact that, by contributing to design, users develop awareness and sense of ownership (Frediani & Boano, 2012). On the other hand, the less-favoured citizens, in particular those living in the poorest areas of big cities, are stopping to conceive themselves as passive recipients of government assistance and increasingly embark on new forms of active involvement from below. These more collaborative attempts nurtures not only people commitment in the management of facilities or assets, but also in their social mobilization (Ibid).

Ranging from a more physical-deterministic attitude often resulting in mere "consultation" about already established plans; or social-deterministic initiatives characterized by social movements demanding governments' intervention; to more constructive approaches in which a major control on the process by local people is encouraged. While the most immediate goal is most of the times the improvements of physical and socio-economic conditions in precarious settlements (such as interventions on housing, infrastructures, livelihoods etc.), the civic engagement and self-determination process these kind of initiatives generate, wittingly or not, becomes a path through which the most disempowered are claiming their rights to a more collaborative transformation and management of habitats (Harvey, 2012; Purcell, 2013; Chiodelli, 2009). Drawing on Lefebvre (1991) space is not a neutral background within which social dynamics occur; on the contrary it is socially, economically and politically produced and re-produced, representing a subject in the process of transformation as well as its tangible outcome. Power relationships, social organizations, institutional arrangements and market trends are embedded in spatial forms and the way in which space is shaped depends on these forces. This is why finding ways for triggering spatial agency (Schneider & Till, 2009) through locals' involvement in space transformation can be considered a form of activism for both citizens and professionals (Hamdi, 2014). Giddens proposes the concept of agency as the capability to 'act otherwise' (1987, pag.216) within a process of reciprocal knowledge production which happens in day-to-day activities and that is practical in its character. Giddens (1976) previously defined the relation between structure and action as an essential element of society, as structure and agency create a duality that cannot be considered separately, as they are mutually

dependent. Structural forms shape people's actions by providing orientation points which can constrain or enable what is possible. While some actions reproduce dominant structures, other has agency, that means has the potential to change the system and remake new rules (Giddens, 1984 as cited in Leach et al., 1999). This means that even if citizens' agency is bounded in a certain institutional framework and needs to find strategies to move within it, ordinary people's capacity to "act otherwise" can attempt to re-think the established. Ranging from contestation to negotiation-based movements and sometimes including both attitudes, the aim is to reorient decision-making in favour of the most disfranchised groups of citizens while altering entrenched inequalities ((Butcher & Frediani, 2014). Boano & Kelling (2013) underline "the inherently political nature of participation" in space transformation, together with "its political potential as contestation and *dissensus* in the production of urban form(s)" (p.55). In their words, such a practice of reconfiguration from below "offers to reveal the lines of power and agency that are written and rewritten in cities, to contest the spatial ordering that assigns everyone and everything its proper place" (p.56). In this vain, the concept of 'insurgent citizenship', first articulated by anthropologist James Holston (1995, 1998) and then incorporated into planning theory by different scholars (Friedmann, 1999, 2011; Sandercock, 1999; Paba 2002, 2003; Miraftab, 2009), finds its significance. Stories of citizens as counteragents in space transformation; which reinsert the 'social' into the mere design of objects and the execution of plans and policies of modernist planning (Sandercock ed., 1998). Holston calls for attention on those urban existences of resistance that arise in the face of controlling/disciplinary planning processes; those practices contesting spaces of representation and preservation while interweaving alternative narratives and imaginaries. Miraftab identifies as insurgent those citizens who strategically move across *invited* and *invented* spaces for participation (2009). According to Miraftab, "hegemonic power is pursued through citizens' consent and perception of inclusion" (2009, p.33) promoted by the so called 'neo-liberal inclusive governance' (Ibid, p.34). This tries to control grassroots within formal channels for citizens' participation. Insurgent practices do not constrain themselves only in these sanctioned opportunities of inclusion (often coming from local governments), but also they invent new forms of engagement for the re-appropriation of urban and rural habitats as well as equal access to resources (Gaventa, 2006; Miraftab 2009,). In this realm, the idea is not avoiding the possibilities of involvement granted by

formal institutions, which can still provide important occasions for dialogue and negotiation. This means being able to navigate within and across both *invited* spaces -where the most powerful invite the less-favoured to participate- and *invented* spaces where citizens make their own conditions of engagement (Cornwall, 2004). According to the America activist and writer bell hooks (1990), people living on the margins have a different perspective, "a particular way of seeing reality, which makes them able to look from the outside in and from the inside out and understanding both". She underlines: 'this sense of wholeness, impressed upon our consciousness by the structure of our daily lives, provides with an oppositional world-view, a mode of seeing unknown to most of our oppressors" (p.149). Similarly, Cammarota & Fine, (2008) assert: "those who have been most systematically excluded, oppressed, or denied carry specifically revealing wisdom about the history, structure, consequences, and the fracture points in unjust social arrangements".

To confirm, in bell hooks' view, marginality can be considered a liberating position, "a location of radical openness and possibility" (1990, p.152) being a state of awareness of the structural power relations which shape a particular context. In this sense, revealing marginality is not only about discovering conditions of subordination or oppression (...) but also finding spaces and opportunities for alternative thinking and practice as this is where dialogue can be established and new visions elaborated (Frediani & Boano, 2012).

International debate on participatory practices in development

The practice of participation in the field of development has been object of significant critiques within the international debate, going so far to be considered as a synonym of manipulative and co-opted approach managed to tyrannize development processes (Cooke & Kothari, 2001). Many scholars, even without ending to this absolute conclusion, have deeply analysed the practice in the last decades and identified its limits (Neef, 2003). Some of these are: a too localized character of intervention and projects in addressing only local manifestation of problems while leaving unchallenged the roots of inequalities and injustice (Mohan & Stokke, 2000). Then, the insufficient exploration and understanding of the role of power within development practices, how this influences both social relations (including gender relations) and the built environment and how empowerment may really occur (Mosse, 1994). Moreover, it has been noticed a certain naivety of

practitioners in the pretentiousness to rapidly understand the complexity of local structures, groups' dynamics and internal relationships among formal and informal institutional arrangements (Neef, 2013). Then the diffused tendency to treat participation as a method to adopt, rather than acknowledging its distinctive of political process (Cleaver, 1999); finally, the common inclination to think about participation as a process for building consensus. Other critiques have been raised by different scholars (Cooke & Kothari, 2001) on the work of Robert Chambers and his project-based participatory practice, such as for example, the lack of scientific rigour of participatory approaches adopting mainly qualitative methodologies and limiting their action at the diagnostic stage. Hickey and Mohan revise criticism in their book *Participation: from tyranny to transformation?* (2004) acknowledging the limits of participation which in many cases "failed to engage with issues of power and politics and has become a technical approach" (p.4), yet underlining the transformative potential of participatory practices, endorsing all those schools of thought that in the last decades have been committed on the reconceptualization of participation practice in development (Ibid). Regarding Chamber's work, Hickey and Mohan (2004) propose that instead of taking it 'at face value' we should consider the strategy underpinning the participatory approach practiced (for example the fight against economism and professionalism,) as well as the genuine benefits that the most marginal people in most of the cases got from such approach. In particular, these participatory practices have contributed to blur the neat juxtaposition between bottom-up people centred approaches and top-down technocratic approaches. And this happened through the various cases in which participatory practices have been scaled up into national and international policy-making. In this sense, participatory practice should be conceived as a transformative form of multi-scaled citizenship linked to right-based approach (Ibid). It should contribute to the development of political capacities of civil society groups, in a way that strengthens their bargaining power and expands their room of manoeuvre within the realm of local power relations (Williams, 2004). The concept of citizenship is no longer conceived as a "contract" with the state bestowing rights and responsibilities as well as ruling the belonging to a certain community while citizens express their preferences through electoral politics (Gaventa, 2004; Brown 1994 as cited in Purcell, 2003). Diversely, newer voices recognize a "substantive" connotation of citizenship concept, the array of civil political and social rights available to people (Holston, 1998), and reconsider

citizenship 'as practiced rather than as given' (Gaventa 2004, p.29). Holston specifies that the formal and substantive condition of citizenship 'shape people urban experience', while 'in turn, the urban experience becomes a principal focus of their struggle to redefine those conditions of belonging to society' (1998, p.51). Gaventa suggests a "more active notion of citizenship, one which recognizes the agency of citizens as *makers and shapers* rather than as users and choosers of interventions or services designed by others" (Gaventa 2004; Cornwall & Gaventa, 2000). However, he suggests working "on both sides of the equation" that means rebuilding relations between citizens and local governments, "going beyond civil society or state-based approaches to focus on their intersections, through new forms of involvement, responsiveness and accountability" (Ibid, p.27). According to Hamdi (2014) participation in development is fundamental to build community, conceived as building the social economy of places; it is essential to unfold reality; to respect and accommodate diversity. To find alternative ways of provision, co-production, ownership and management; to mobilize resources, reduce dependency, build resilience and reveal power relationships (Ibid). At the same time, participation does not necessarily mean "building consensus" within a contested environment. On the opposite, consensus can be considered as a mean for maintenance of the status quo (Cooke & Kothari, 2001). In the book *The Nightmare of Participation*, Miessen (2011) delineates *conflict* as an enabling instead of disabling force which brings differences to the surface and he suggests developing strategies which allow platforms of dialogue where a polarity of actors can exist even in antagonistic positions. Miessen puts the attention on the issue of responsibility of different stakeholders developing their own agenda within the same process (Ibid). A realm where all voices can be recognized, heard, and expressed with responsible and proactive intentions. This idea of participation as conflictual is defined by Miessen as a 'micro-political practice' through which participants become active agents in the 'force field they are facing' (Ibid, p.93).

According to Frediani & Boano (2012), revealing *dissensus* is a mechanism to generate coalition and solidarity in certain time and context, which is fundamental to strategize initiatives and interventions.

It seems that is by reconfiguring the boundaries between what is commonly conceived 'order' and 'disorder', and sometimes subverting this distinction, that action can be gradually scaled up in size and impact. Boano and Kelling (2013) drawing on Rancière, state: "when the excluded seek to establish their identity by

speaking for themselves and striving to get their voice heard and recognised as legitimate" (p.43) they claim to exist as political subjects, and not for the inclusion of the excluded in the established order, but for strengthening the capacity of questioning the given order. Space, through its diverse forms triggered by spontaneity and new beginnings, symbolizes both materially and politically the interruption of the 'natural' order and, in this sense, it should be "associated to change as a generative rupture in the order of things" (Dikeç, 2012, p.675).

Space on the everyday

Participatory projects, temporarily determined in its nature, are dependent on the rhythm of the specific context in which operates. They are always 'a piece in the puzzle' of bigger and longer processes of transformation. This is why interventions should be capable to cross the multidimensional character of change. Apart from the immediate improvement of living conditions through physical upgrading, in fact, participatory practices should have the strength to challenge established procedures in order to influence policies in the longer term.

The "right to the city" embodies the idea of reconceptualization and reorientation of range and modalities of decision-making (Purcell 2003) through which active citizens, organizing themselves and managing their own habitats, struggle for involvement in urban development transformation processes (Purcell, 2013). Harvey affirms: "there are occasion when the ideal of human rights takes a collective turn" (2012, p.3), as when the rights of citizens and minorities come to the fore in search of recognition (Ibid). Originally, Lefebvre (1991, first published in 1974) explores the *production of space* and describes the urban space as an *oeuvre* of its inhabitants, a creative product of and a context for, their daily life. Space is perceived, conceived and lived (Lefebvre 1991; Soja, 1996) that means used, represented, experienced and therefore continuously produced and reproduced. The "process of producing space necessarily involves constructing the rhythm of everyday life" (Purcell 2003, p.577). Space, in fact, should be understood as an integral part of social life and of the articulation of its cultural dynamics. The focus on spatial practice is essential in this sense, conceived as a "collective process by which decisions are negotiated, plans designed, action taken in response to need and aspirations" (Hamdi, 2014, pag.1). Hamdi underlines the importance of working from the details of the everyday life, to make meaningful locally and consequently open opportunities for big and lasting change. Starting from

dynamics related to space on the everyday means to give value to local understanding and use of places; acknowledging people as experts of their own territories and social context and in particular considering what already exists in terms of resources, capacities, potentials, social values, aspirations to build up on these assets.

Exploring contexts through co-production of knowledge

Exploring space means also dealing with relations of power and institutional arrangements. These are shaped by agency and power in specific contexts and influence the ways in which local actors access, use and derive well-beings from resources and services (Leach et al., 1999). Institutions can be related to both formal, as part of the legal framework, and informal conceived as 'regularized patterns of behaviour' that emerge from underlying structures or sets of rules in place (Ibid, p.237). Access and control over resources (but also impacts on them through different uses) are mediated by a set of interacting and overlapping formal and informal institutions.

In certain contexts, for example, the possibility to access resources is related to privileges assigned on the base of gender, ethnical origin or level of social integration (such as being immigrant or resident). Therefore, participatory practices particularly related to natural resource management and planning necessarily need to uncover internal systems of power and specific social and environmental dynamics, in order to contribute to enhancing the claim-making capacities of different groups in uncertain conditions and contested realms. The need of understanding local complexities while exploring contexts calls for a new approach which has a collaborative production of knowledge as a corner stone. Albrechts (2015) describes this approach as radical within planning theory. By focusing on strategies instead of plans; providing frameworks instead of technical regulations and considering a pivotal role for civil society in co-producing knowledge (Ibid). This is conceived as a mode of knowing which "avoids shaping a future in a way that is just in line with the aspirations of the most powerful segments among actors", while involves "citizens and grassroots organizations for a more substantive engagement with the political (Ibid, p.520). Co-production of knowledge entails: face-to-face collective practices; reciprocal and social learning that this interaction generates; the capacity to explore identities constantly made and re-made in spatial terms; conflicts as an agonistic form of designing and the propensity to imagine

together a better future. Moreover, to increase the possibilities of active citizens engagement, Cornwall points out the importance for people to have the language with which they can argue with technical specialist and government officials that means equipping ordinary people with the "weapons of the powerful" (2004, p.85). And he adds: "these strategies do not come in toolkits ore one-size fits-all boxes, yet they are contextual and contingent as well as conditional on a host of complexities" (Ibid). We need to "generate new ethnographies of participation", we have "to locate space of participation in the places in which they occur framing their possibilities with reference to actual political, social, cultural and historical particularities rather than idealized models of democratic practice" (Ibid., p.87).

Part Two

People Map-Making as a Transformative Practice

Somewhere between the rainbow and the Internet a place
that is important to you is struggling to maintain its integrity (…).
Making a (…) map is about creating an expression of values and
beginning to assert ideas for involvement.
It is about taking the place in your own hands.
(Clifford, 1996)

Mapping with people

It is widely recognized the need for a shift from considering people as target of planning processes to conceive them as key actors of socio-spatial transformations and related resource management (Madanipour, 1996; Cuthbert, 2007). A more collaborative style of design and planning is recommended in order to 'manage our co-existence in shared space' (Healey, 1997 p.3; 2003). Participatory practices need means for interaction, information gathering and clear communication among different – and generally conflictual – stakeholders. During people involvement a rich amount of data are generated, social dynamics and social relations are triggered. The challenge is to have instruments capable to capture this local knowledge, realistically represent socio-spatial dynamics, supporting analysis, dialogue and negotiation. Particular attention needs to be paid on methodologies of involvement which safeguard, recognize and value local inhabitants' contribution. Outputs of concerted processes should be authoritative, communicative, understandable and easily usable by specialists, government officials and technicians. People mapping is a creative process in which people represent their territories and places of living according to their life experience, local knowledge and sense of belonging. Analysing different context's features and problematic issues, they uncover existing resources, potentials and find opportunities for improvement and transformation. Through map-making they deconstruct their reality; they unfold the invisible structure of their place of living, its apparently disordered logic and its potentials. Maps stimulate exploration and provide holistic and systemic perspective essential for better strategies. Maps are tools for understanding places, building awareness, planning for reducing vulnerabilities;

visualizing, representing and communicating issues of any kind. Wood (2010) in his book Rethinking the Power of Maps, made an interesting metaphor: "map is an engine where an engine is a machine that converts energy into work (...) maps convert energy to work by linking things in space" (p.1). So that, considering energy that through an engine becomes work, maps 'do work'; social energy through a map become social space or equivalently social energy through a map becomes knowledge (Ibid). Maps represent meanings, uses and relations interweaved in the social production of space; they are never a final outcome but a dynamic tool and the process of their creation is important as much as the product they embody. Mapping is a mode for co-production of socio-spatial knowledge, essential for unfold the variable contextual geometries which are on the base of any process of design and planning, including management of resources. In this sense participatory mapping can be understood as a "means to re-problematize the process of knowledge production with respect to its visual representation and spatial understanding and to expand the room of manoeuvre of those typically disenfranchised from such process" (Allen et al., 2015, p.261). Critical cartographers consider maps as tools of power and knowledge and they explore maps' role in the construction of identities, agency, as well as capacity of liberating potentials (Harley, 1989; Corner, 1999; Wood 2010). Yet, participatory mapping is also a political practice enabling a political space in contested territory through which different positions and conceptions can effectively dialogue; while disrupting conflicting interpretation of reality and shedding new perspective on what is actually needed in terms of intervention (Allen at al., 2015). As Harvey (1996) argues geography and justice are strongly related as they co-construct one another. Citizens might reinforce or resist and transform the production of injustice in space through place-making (Allen et al., 2012). Especially in those areas where interests are contested; distribution of assets and opportunities unequally determined and people struggle for improvement, the process of mapping, inherently spatial and political, can contribute to activate people capacity in search of a more just space transformation and sustainable management of resources.

Space, Scale and Time

The practice of participatory mapping intrinsically brings issues of space, time and scale. These are integral components of the mapping process; they are all socially constructed and mutually related. Scale is not only the ratio of distance on a map

to the corresponding distance on the ground. Indeed, considering the multidimensional character of socio-spatial phenomenon, scales embody the interplay among different stakeholders (MacKinnon, 2010); the levels in which they act and the spheres of their agency. “Different actors can invoke scales strategically to enrol allies, build relational power and achieve specific political ends” (Allen at al., 2015, p.264). According to MacKinnon (2010), scalar relations, or “scalar politics” as he defined them, are shaped by the processes of struggle between subaltern groups at lower scales (neighbourhood or locality) and powerful social actors on higher scales (such as the regional, national and the global). Smith (2004) distinguishes between two kinds of scale interplay: “scale jumping” which refers to the capacity of social groups or organizations to move to higher level of activity in pursuit of their interests; and “scale bending” which describes how groups and individuals undermine existing structural arrangements which tie particular social actors to certain scales (Smith 2004 as cited in MacKinnon 2010). Mapping is a means for visualizing places and related different physical dimensions (urban, rural, territorial etc). At the same time, it helps to understand the tensions at stake, as well as possible impacts of interventions and decisions at different scales. Moreover, the process of mapping entails the chance to challenge institutionalized modes of space production putting into communication and dialogue those who usually ‘conceive’ places from outside, often plan and make decisions about interventions, and those who ‘live’ places and normally do not have a say about (Allen et al., 2015). In this sense, mapping can increase the scalar authority of the local, showing its inner characteristics and the reality of specific contexts (in terms of conditions, diversity and people practices or strategies), in order to contest the homogenization of vision on territories so common within planning circles.

However, the local should be always analysed in relation to wider territorial scales, to avoid the risk to fall into particularism which, as hooks (1990) underlines, have to be rejected as much as the universal visions that homogenize territories.

Furthermore, the way places are represented or not represented on maps, using different scales on both official maps and on people maps, is definitely demonstrative of how space is perceived, conceived and lived at different levels.

Time is also an important component of mapping practice, in particular in relation to the production and representation of places. Territories normally evolve and change continuously through a slow stratification of socio-spatial layers. Through mapping, people express time-based narratives of spaces according to their

memories, attachments and trajectories (Ibid). The process of mapping allows navigating past, present and future of specific contexts through depicting background and evolution of spaces, use of resources and interrelated issues.
This becomes a fundamental base to build upon when seeking for adequate transformation, improvement of living conditions and resources administration.

Origins of people mapping

The drawing of territories on maps by local people is undoubtedly an ancient practice. Turnbull in *Maps are territories* (1989), for example, reports about a manuscript map of the Mississippi presented in Washington in 1837 as part of a land claim; a map of the Marshall Islands and its ocean made of shells and sticks; several other examples of territory representations by the Australian Aborigines and the San of the Kalahari.

Cartography in general has been widely studied by scholars particularly in Anglo-American and French contexts through the adoption of different perspectives. Some focused more on mapping communicative properties; some analysed its role in semiology. Others, with technological advances, made efforts in scientifically conceptualizing and improving mapping through geo-visualization. While some others sought for 'value free' cartography, objective and accurate in the representation of reality. However, a new challenge emerged in cartographic theory at the end of the 1980s when Brian Harley (1989) argued that maps are socially produced and present subjective versions of reality (Doodge, Kitchin, & Perkins, 2011). Although at that time there were already analysis on the role of maps in society (as cultural artefacts and in propaganda) Harley drew inspiration from Foucault and Derrida and started focusing on the power of maps. He argued that maps are products of the people who create them; maps capture people vision and interests as well as their intentions in what they seek to communicate (Ibid).
In this sense, a map can be considered a product of power but also it exerts power; it represents the social context and needs to be understood through the deconstruction of the power relations inherent within its production (Ibid). Similarly, Wood (1992) defines maps as complex sign systems and social constructions. Another change in perspective within mapping theory emerged at the end of the 90s when scholars changed focus from what maps represent and mean to how maps work and affect the world (Corner, 1999). According to this view mapping was not conceived only as a representation of the world but rather as a re-

creation of it (Doodge et al., 2011). Corner (1999), drawing on Baudrillard, argues that maps and territories are co-constructed and mapping activates territories, through unfolding potentials and being a conduit of new possibilities. As a result, the practice and the process of mapping became central in space production, even more than its design, meaning or reading. Maps then develop "through a mix of creative, reflexive, playful, and tactile practice affected by the knowledge, the experience, the skills of the individuals who perform mapping and shaped by the context of its re-production" (Doodge et al., 2011, p.6).

The origins of participatory mapping particularly in developing countries coincide with a shift in development field both in its rhetoric and practice. The shift includes the reversals from a centralized standardization and homogenization of blueprints to a particular attention on local diversity and learning processes (Chambers, 1994). In this change an important role has been played by a family of approaches and methods which emerged in the late 80s being ideated by Robert Chambers of the International Institute for Environment and Development (IIED), England. The different Rapid Rural Appraisal (RRA), Participatory Rural Appraisal (PRA) and Participatory Learning and Action (PLA) spread in development practice between the 80s and the 90s. Initially adopted in particular by practitioners working in rural areas of developing countries, the methods allowed the learning and assessment processes to be extended into analysis, planning and collective action (Ibid). PRA indeed developed from RRA when a particular attention was given to local people conceived as main actors of processes. While PLA was a broader term suggested by Chambers in 1995 to rename PRA when participatory approaches were not limited to rural areas and when there was the need to point out that research is for action and not only for appraisal.

The main methods which these approaches included are semi-structured interviews, transect walks, participatory mapping and diagramming. Within Rapid Rural Appraisal (RRA) sketch mapping was already used as method of analysis, however maps were made by process facilitators (Chambers, 2006). As Chambers remembers, this happened "often with serious inaccuracies and omissions" by professionals that were pointed out by the natives themselves (Ibid, p.3). It was within PRA that professionals started to step back and realize that local people have the ability to make their own maps. The definition of "expert" started being questioned together with the kind of relationship established between people and facilitators.

The theoretical sources of people mapping practice are various, ranging from agro-ecosystem analysis, social anthropology, activist participatory research, to critical pedagogy. Agro-ecosystem analysis was developed in Thailand from 1978 onward by Gordon Conway and his colleagues. Drawing on ecological thinking, it combines analysis of systems' properties (productivity, stability, equitability, sustainability) with pattern analysis of space, time, relationships, values and decisions (Chambers, 2006, p.954). Some of the major contribution of agro-ecosystem analysis to RRA and PRA was the use of transects (walks and observation); informal mapping such as sketch mapping; diagramming and innovation assessment.

Then, social anthropology considerably influenced the practice particularly in relation to the difference between the etic (outsiders' mental frame, categories, views) and the emic (those of insiders). This was in addition to the typical qualitative research methods such as informal interviews and conversation, participatory observation, careful recording; as well as the attention and value put on indigenous technical knowledge (Ibid).

Another important sources of people mapping was Participatory Action Research (PAR) theory that drew inspiration from Brazilian pedagogist Paulo Freire's (1970) whose main ideas are at the base of collaborative practices. The core of his approach is considering people as active agents and knowledge keepers rather than empty boxes to be filled. In this sense locals are *per se* creative and capable to conduct analysis of their own living contexts. Furthermore, according to Freire practitioners should seek for a flexible, listening, dialogical attitude in the role of people's supporters for enabling 'conscientization', which means developing a critical awareness of one's social reality through reflection and action.

Participatory Action Research re-collocate knowledge and its production outside the entrenched common knowledge infrastructures (academic, professional, scientific etc.) to return it to common citizens who live their everyday life. This enables what Arjun Appadurai (2006) called the "right to research" that is "the right to the tools through which any citizen can systematically increase that stock of knowledge considered most vital to their survival as human beings, and to their claims as citizens" (p.168). Within PRA and PLA, mapping in developing countries was mainly used for natural resource management (such as forestry, watersheds, irrigation, coastal administration, fishing, pastoralism, parks and conservation, biodiversity, endemic species etc.); but also land use, tenure and land rights claims; negotiation

of boundaries and conflicts resolution. These are still among the main uses of today, yet the practice has extended significantly and the purposes of mapping widely range from social mapping, to health and food security, mobility, education, poverty reduction, water and sanitation, agriculture, crime, monitoring and evaluation and more recently planning and design (Chambers 2006).

Mapping experiences in Asia

People map-making as a face-to-face collective participatory process is today widely practiced worldwide. It takes different forms and it is adopted with different purposes depending on specific contexts and backgrounds. The spheres of interest for this research work are generally urban and rural planning, urban design, natural resource management and disaster recovery. The general objective is the improvement of living conditions particularly in disadvantaged, problematic or calamities affected areas. Sometimes the need of mapping arose in spontaneous informal settlements which are built on occupied land, invisible on the official cartography, thus in need of data and recognition. Other times, mapping has been adopted by indigenous populations to claim their land rights or managing environmental resources in natural areas. In other cases, it has been a valuable tool for designing interventions such as sanitation infrastructures. Moreover mapping has been an important role in increasing awareness about climate change and related issues, reducing vulnerability in particularly affected or threatened areas as well as collectively managing community-driven after-disaster reconstruction processes.

The Asian Coalition for Housing Rights (ACHR) is a coalition of professionals, NGOs and community organizations committed in finding ways to make change with the direct involvement of the poorest in Asia. They have been working for five years 2009-2014 under a program called Asian Coalition for Community Action (ACCA) which supported poor communities in 215 cities of 19 Asian countries. ACHR works in collaboration with The Community Architects Network (CAN), a network of young professionals such as architects, planners, researchers, who operate across Asia on community-driven projects related to housing, citywide upgrading and disaster recovery (Huang & Castanas, 2016). Through mobilizing local groups and institutions, they promote and practice participatory processes with local communities in

design, planning, and capacity building. Starting from concrete actions in response to local needs, according to the belief that practical motives can trigger solidarity and reciprocity within development initiatives, ACCA made of the financial capacity of the poorest its main objective (Boano & Kelling, 2013). This is why the main mechanism promoted by the program to support the poor in organizing themselves, are constituted by 'collective saving schemes' and, when possible, by the creation of Community Development Funds (CDF). These latter work as revolving funds (repayment can be lent on to other communities) and constitute a proved emancipatory system particularly when communities are looking for recognition within their institutional framework, as governments resulted more interested in negotiating with organized and skilled communities particularly those holding financial resources (Boonyabancha & Mitlin, 2012). People map-making (particularly sketch mapping and scale mapping), is the main method of locals' mobilization and involvement in design/planning processes within the program. It is initially used for gathering data and information both at the local and city level; useful for organizing saving groups, survey and enumeration as well as for land claims or networking among different communities. Then, pushing for platform of dialogue with local governments, people use maps to design intervention and draft comprehensive site planning with the support of young architects and experts (Archer et al., 2012). Their map-making practice is geographical, city-wide, site-specific, household-based and issue-based. Geographical mapping is particularly relevant for communities at risk of natural disasters (mapping environmental vulnerabilities), or dealing with natural resources management. Citywide survey and mapping resulted extremely important in cities with multiple low income communities facing similar situations such as housing scarcity, land tenure issues or relocation (Ibid). Settlement (or site) mapping, households and issue-based mapping are all fundamental in the process of informal settlements' upgrading. Communities represent on maps their own place of living identifying constraints and threats as well as social, economic and physical conditions; infrastructures deficiency and sanitation problems. They also explore possible solutions; they identify skills, opportunities and resources of any kind available in their contexts. They also map relations in terms of community's internal relations within their settlement, then between community life and the rest of the city/territory and, particularly in rural contexts, between communities and natural environment. From the basic

community hand-drawn maps, community architects help to create proper databases and make scaled-maps helping people to properly measure dimensions all over their sites. Finally, community architects make technically accurate designs or diagrams to better present results (Ibid).

Another important practice that initiated in Asia and spread worldwide is the community-led enumeration and mapping developed over time by several organizations of the urban poor networked under the umbrella of Shuck/Slum Dwellers International which are contributing to developing a collective identity within the city to engage in political negotiation with the government (Allen et al., 2012). Enumeration and mapping by slum dwellers consist in settlement profiles, which trigger collective sense for future redevelopment proposals; in households surveys, crucial for financial aspects related to rehabilitation and as proof of dwellers presence to fight evictions; as well as in vacant land surveys within the city, in case of relocation when redevelopment in situ is not practicable (Patel & Baptist, 2012).

Orangi Pilot Project in Pakistan

The Orangi Pilot Project' NGOs are partners of the Asian Coalition for Housing Rights (ACHR) and designates four Pakistan NGOs working in Karachi since 1982 under the common goal of supporting disadvantaged communities. With their help, residents have been successfully involved in map-making with different aims, such as: planning and auto-implementing sanitation upgrading in squatter settlements; lobbying for land title in "urban to be" Goths villages; pressuring for a more equal financial resources allocation. In addition people mapping was particularly useful in building relationships with local governments, as well as involving the youth and understanding reality. Perween Rahaman[1], who has been the director of the Orangi Pilot Project Research and Training Institute (OPP-RTI) since 1988, during the ACHR regional meeting held in Bangkok in 23-28 February 2013 (just one month before she died) she said: 'We are all mappers! We are the Ninja Turtles of mapping! Maps are to our work what x-rays are to a doctor's: they tell us where the problem

[1] Perween Rahman (22 January 1957, Dhaka – 13 March 2013, Karachi) was a Pakistani social worker and activist, architect, urban planner and director of the Orangi Pilot Project Research and Training Institute. She worked for decades on poverty alleviation with the poorest in Karachi through projects which encouraged communities to maintain their own systems for sanitation, health, housing, micro-finance ad lobby for land title. Rehman was an outspoken critic of the land mafias in Karachi and their political patrons. She was murdered on 13 March 2013. Her legacy is still in progress.

is and how to solve it' (CAN, 2013, p.10). This is an extract of her inspiring speech I personally heard in those days:

> "*Orangi is situated in the periphery of Karachi is a cluster of 113 low income settlements with a population of 1.5 million. We first mapped the sewerage and drainage and water lines as well as the clinics and the schools, and the block makers yards (…). People do self-help, because they need to survive. So, it was very important to understand who was doing what - where is the sewerage line? Is it a government sewerage line or a people-laid one? The kind of information we gathered and mapped spanned every sector in Orangi, and all the actors in involved. That mapping has now crossed the entire Karachi city. First we made 'walking maps' of these settlements by going through them with the residents, including Goth's elders and community activists. Then we marked them on the Google satellite maps and put the two together. We were able to map each and every Goth settlement which had become urban. The government's data showed that there were only about 400 of these Goth settlements. But our mapping showed that there are more than 2,000 of such settlements. I think the idea of our advocacy was to make the government understand that there are too many people, you cannot just evict them! These communities are a fait accompli (…), these are the oldest settlers in Karachi! We started mapping all these Goth settlements in 2006, and in April 2010, the government announced that more than 50% of all these urban Goths villages - 1,063 of them - were to be given the land title. And it was the maps that did it. Just the maps! I remember one thing: all of us were talking with the elders in these villages, and we asked, if it is so important, why didn't you lobby for land tenure before? They said, that when they used to go and lobby without a map, nobody thought it was very serious, nobody took them seriously. But when they went with the map - with the map they became visible. The map made us visible. And the map made the government take us seriously - That is the power of maps! (…). Maps have helped professionals to understand reality and to have the courage to accept reality. Maps have also helped the government to understand that communities, NGOs and media can have information, so they can pressure them. Today, all our maps are being used by the government, the media and even the politicians. In this we have a strategy. Sometimes on a map, we do not put our names. We say, OK, you put your name: you put the chief minister's name; you put the government department's name, as long as you accept that map! That is also a strategy for us, that we take a back seat, we become invisible. And sometimes the people use the map and put their community organization's seal on it - and we love that! It's great for us! And of course the maps help the community to understand also. Because the people within settlements may understand their own work, their own few lanes - but an understanding of an entire area, that is needed. And once that understanding of the larger area is there, the advocacy goes to another level. There is also a lot of relationship-building that happens within a community, during the mapping. Because whenever the information is gathered, it is gathered while talking, while discussing, while actually being in the settlement. Relationship-building has been the key that has helped advocacy and citywide upgrading!"* (CAN 2013, p.10-13).

Using or not using technologies

In India, Humara Bachpan organization is leading a campaign for child-led development, organizing mapping workshops in child clubs in a handful of major urban centres including Mumbai, Delhi, and Hyderabad (Sturgis, 2015). What

children make are their dream aspirational maps of their marginalized neighbourhoods, representing the need for toilets, clean water, trash bins, parks, playground, street lights as well as a more child-friendly design, even considering child-specific size of communal toilet seats which are never thought for children. 'The initiative mixes activism with adolescent fun; new friendships are made, hands are covered in coloured ink, and leadership and planning skills are nurtured' (Ibid.). Yet this results also into serious work, as after the map is complete, leaders from the child clubs present their work to local officials. Since 2011, UNICEF has been encouraging young people within the Humara Bachpan project to use mobile technology and open data to map environmental and health issues around their homes, however that technology is not always available to them; so, most of the child-led mapping campaign count on old-school topography materials, such as paper and 'rainbow-spectrum of markers' (Ibid).

Both Orangi Pilot Project and Community Architect Network welcomed the possibility of including in the mapping process more "technical" tools. They used Google satellite images obtained online, which have resulted quite successful in the involvement of community. From "above" people could better recognize their settlements and orient themselves more than in cadastral maps (which often are incomplete). The satellite images of sites are used under a tracing paper and the community draws directly on it, obtaining a paper map with geo-located information that allow clearer communication when presented to government officials. However, some attempts carried out within OPP's projects to use Geographic Information System (GIS) failed. It resulted too time consuming and it has been considered a tough and detached tool in relation to people involvement. Perween Rahaman during her presentation said "*unfortunately, GIS does not get us close to communities*". Another interesting Asian case is represented by the Shelter Associates, a Civil Society Organization (CSO) based in Pune, India, which comprises architects, community workers and international volunteers, which supported people living in Pune's huge slums in a process of collecting, organizing and publishing slum data gathered through surveys and mapping (Shelter Associate's website). They work with all stakeholders, including the urban poor, elected representatives, government officials to generate inclusive policies and projects. The objective is sensitizing the government in involving slum areas in city planning and securing a fairer allocation of government resources in particular on sanitation and housing for the poor. In their case, slum data are collected by local

communities' members, re-organized by experts also using GIS, to be then presented to authority as an overlay on Google Earth.

Why GIS

Participatory mapping can be conceptually located within "counter-mapping", defined by Harris & Hazen (2006) as any effort that fundamentally aims at contesting and undermining predominant structures both regarding cartographic conventional products or processes, and in relation to power hierarchies and spatial injustices. The term "counter-mapping" was introduced by Nancy Peluso to refer to mapping practices by indigenous people in Kalimantan, Indonesia as they successfully made maps to contest Indonesian state land-use plans (Peluso, 1995). However, from that experience the term kept resonating not only to refer to indigenous mapping, but also to other experiences and practices worldwide such as protest maps, map art, critical cartography (Wood, 1992), community Parish Maps (Clifford, 1996) and the Critical Geographic Information Systems (GIS) literature (Sheppard, 1995, Schuurman, 2000) which more recently developed towards Participatory GIS practice. Geographic Information System (GIS) is normally used in development planning and in numerous other fields and disciplines. It gives the opportunity to manage geographical information handling huge volume of data both quantitative and qualitative. It can incorporate remote sensing sources, printed and digital maps. It can bring together different themes or layers and through their overlapping and intersection allow complex spatial analysis. It can deal with land morphology use and ownership; settlements' evolution over time; environmental hazards, water features and services systems; infrastructures and sanitation. But also cultural heritage, livelihoods, resources management, traditional knowledge, people fluxes, social networks and much more. GIS allow analysing different situations simultaneously, assessing risk and vulnerabilities, evaluating impacts, building strategies, exploring relationships, examining possibilities. It is imaginable that searching for ways of integration between a grassroots collective approach as people map-making and a technical tool as GIS entails an enormous potential within the idea of transformative participation and practice described so far. However there are several aspects to be taken in consideration. The following is a path through grounded hands-on experiences in search of a good balance and integration of map-making and technologies, while dealing with the challenge of pursuing concerted development processes.

Part Three

Participatory 2D scale Mapping in Vietnam and Philippines

"...There is no definite methodology.
People have their own rhythm.
People's thoughts and dreams
cannot be formatted to fit
into best practice models."
Perween Rahman

This research work was inspired by six-months personal fieldwork which consisted in a scale mapping process carried out in 2013 (from February to July) with rural communities of Vinh in central Vietnam. The initiative is part of the Junior Professional Program (JPP) of the Asian Coalition for Housing Rights (ACHR) and the Community Architects Network (CAN) in partnership with the Development Planning Unit (DPU) of the University College London (UCL). The program gave the opportunity to five selected alumnae of DPU to work with local communities in some of the 19 countries in which ACHR and CAN operate. During the six months the JPP's practitioners had the chance to be part of the 2nd CAN Regional Workshop (June 2013) held in Metro Manila, Philippines and lasted for ten days.

Vietnam

The picture

Only forty years ago Vietnam was desecrated and dreadfully wounded by the war, but amazingly it has revived mainly due to its population's strong character. It's a country extremely rich in culture and environmental beauties, with 4000 years of awkward history and fascinating legends. Vietnam is a single-party Socialist Republic officially espousing communism. Only the political organizations affiliated with or endorsed by the Communist Party can participate in elections. The Communist Party has a central role in all organs of government, politics and society, performing key legislative, administrative and executive functions at all levels. Provinces and Municipalities refer to the National government and are

divided into districts, provincial cities, towns and villages. Provincial cities and towns are subdivided into urban wards and rural communes. The local organ of the State democratically elected, is the People's Council that in turn elects its executive body: the People Committee. An important role is played by the Vietnam Fatherland Front, a pro-government group connected to the Party, covering mass movements' organizations and including relevant unions such as the General Confederation of Labour, the Communist Youth Union and the Women's Union among others. The Front is regarded as representative of the people, a political seat of their power and for this reason Vietnam's Constitution gives it a special position in the political system and a relevant role in society as upholder of ideological and spiritual unity in the country and point of reference in the application of social government's programs. The different unions, which are part of the Front have a hierarchical organization similar to the party, and each of them has representative members included in the People Committees at all levels.

Today the country experiences many of the growing pains and contradictions of modernization, being continuously stretched between deep-rooted local traditions and inevitable development pressures. Some mountains are still untouched and coastal areas deserted; meanwhile sites both in the north and the south are among the most touristic places in the world. While countryside continue to exist in a distant past made of local knowledge handed down through traditional practices, urban contexts rapidly become new metropolis and encompass their contiguous rural areas impacting the relative slow rhythms and consolidated dynamics. Besides, Vietnam cities faces many of the same problems related to fast urban growth as other Asian countries, consisting in the increasing numbers of poor households without secure land or decent housing. The youngest generations are curious and fascinated by new international trends, yet at the same time very protective and proud of their culture and nationality. These dynamics affect even a small city like Vinh, of around 500,000 inhabitants, located in north-central Nghe An Province, on a delta surrounded by mountains, bordered by the East Sea. From the early 30's, it developed as a port and banking town, known for its strong working class, revolutionary movements, and as hometown of important figures such as Ho Chi Minh President. The cityscape is characterised by low-rise housing with standardized narrow frontages and deep interiors, houses are brick, typically pastel coloured and highly decorated. Dilapidated "collective housing" both in the form of row houses and apartment blocks, is also quite common. They sit in sharp

contrast with the new high rise buildings scattered around the central area of the city, the result of the Doi Moi ("Renovation"), a series of economic reforms initiated in 1986 with the goal of creating a socialist-oriented economy combining state control with free market mechanisms and opening to external private investments. This entails a mixed economic system which still looks for adaptation in the traditional context of the country (JPP Report, (Dovarch et al., 2014)

Fig. 1 Social housing apartment blocks and typical Vietnamese one-family houses

Background

Vinh is one of the Asian cities that benefitted from the ACCA program of ACHR. At the time of the mapping project people in the city, both at the commune and at the ward level, had already been involved in several small infrastructure projects and in a bigger project on community-driven collective housing upgrading. ACCA program brought to Vietnam a completely new and alternative way to conceive citizens' involvement, opening spaces for people-led initiatives with residents as designers and doers supported by financial partnerships with local government. Vietnam has a long tradition on collective saving at the local level, so the conditions were favourable on this side when ACCA came. However, participatory initiatives from below are not common in the country.

In 2000, ACHR and ENDA-Vietnam began collaborating with the National Women's Union in a number of cities to strengthen community savings groups and set up city-level community development funds (CDFs) to link these savings groups and expand their development activities (ACHR, 2014). The partnership supported a

series of national meetings workshops on savings mobilizing community funds and local young professionals. The government has poverty reduction in the country as main focus; however, they could not find effective ways of implementations. In 2007, ACHR and the CDF network made an important new partnership with the Associated Cities of Vietnam (ACVN), a national union of 103 towns and cities. ACVN worked in close collaboration with the CDF network, the Women's Union and ACHR to implement and scale up the ACCA process in Vietnam through experience sharing and collaboration among cities' governments (Ibid).

Fig 2. Hung Hoa Commune paddy-fields

In all cities the ACCA small project funds have gone into the CDF, which is managed by the Women Union and includes also the communities' savings. From the CDF funds are passed to communities as low-interest loans (so the money revolves), to partially finance their infrastructural projects. Moreover this mechanism was able to leverage additional funding unlocking other local resources, from community members but in particular from local authorities. The CDF in Vinh was set up in 2006, with $13,000 and used for community water supply and organic vegetable-growing projects. The ACCA funds started coming in 2009 and, together with community saving and government funds, allowed housing, infrastructure and disaster livelihood loans (Ibid). (See Appendix for Cua Nam housing project).

Working with rural communities

The city government of Vinh, in the person of the vice mayor allowed to carry out a fieldwork of six months in Hung Hoa Commune. This is a peri-urban area mostly covered of rice paddies where are located nine hamlets inhabited by farmers working in the area and living in single-family detached houses. The area is located in the outskirt of Vinh, still preserving typical Vietnamese rural features including strong social networks and traditional customs. Being located on the edge of the urban area and suffering the rapid urban expansion, the commune presents inadequate conditions in terms of infrastructure. The area in fact is affected by significant flood once a year which destroys one of the two crops potentially available. The flood happens during the monsoon time and the water comes both from the overflow of the river Lam that is located on the southern edge of the area, and, in the form of waste water, from the city which is located in the upper northern zone of the Commune. The task given to us by the government was listening to people opinion about the rural development plan which the government had already elaborated for the area through the Urban Department. Yet, in doing this, we decided to explore new and scalable methodologies that could strengthen the participatory dimension in the process of planning (JPP Report, Dovarch et al. 2014). The work unfolded through a map-making process carried out with local communities. However, every single meeting with communities of the nine villages as well as the steps of the process have to be first agreed with Hung Hoa People Committee in the person of the vice-chair of the Commune. Initially, the government did not provide with any translator for the fieldwork and generally Vietnamese people do not speak English. Therefore, through the vice mayor we contacted the vice chairman of Vinh University, who arranged for us to meet with students of the Foreign Languages Department. After a selection based on the students' motivations, it was set up the 'Hung Hoa Learning Team', 18 English-speaking volunteers enthusiastic to help the work with communities. A series of lectures and workshops were organized by us to prepare the students on the mapping process. Translators, even if local, are not passive actors in participatory practice; they need to understand carefully internal dynamics and made aware of the meaning of 'participation' to be able to support people and facilitators effectively.

Fig 3. Class and fieldwork moments with Hung Hoa Learning Team

Mapping process

The mapping processes included, first, several community discussions and transect walks (site visits and walks guided by community members). The flooding was soon identified as the main priority by the inhabitants of Hung Hoa and they decided to focus their mapping activity on planning the drainage system. Actually it was supposed to be a quite tough 'engineering task' and none of us was expert in this field, but people were confident since the beginning with their purpose and firmly wanted to embark in this attempt. They were worried that city government was not enough committed on the issue of drainage in the redevelopment plan, and actually looking at the government official maps, although drainage was one of the action mentioned within the list of interventions, the objectives of the redevelopment plan seemed generally much more focused on tourism. Probably tourism was considered by the government as a last step; however people strongly needed to see their basic priorities addressed before being able to welcome ideas about possible further developments in their area.

Fig 4. Mapping the flood and the drainage system in each hamlet. Woman presenting the community drainage plan for her hamlet to other community members of the Commune.

Community members analysed the flood and the level of impact in the different villages of the Commune. They independently identified different land elevations and water directions; then, taking in consideration the existing water gates to the Lam River, they planned the location of water pumps, the upgrading of small ducts and main channels, as well as the construction of those missing. Every of these information were represented on cadastral maps provided by the local government. Sometimes these maps were not updated and without any hesitation people drew all the absent parts. At the beginning men were keener to work on the drainage, while women started the process focusing on their collective savings and resources, but soon all community members joint together on the drainage mapping.

The work was carried out first hamlet by hamlet contacting the community leaders through the local government. These invited also community members making sure that all the unions were represented (youth, women, elders, veterans and so on). Finally the mapping work moved to the system of drainage of the entire Commune, with representatives of each hamlet working together.

Fig 5. Drainage maps and resources maps

Fig 6. Final presentation to government officials by community members

People considered their resources in terms of community organization and leadership, saving management, availability of materials, costs and skills and they made a plan of action. They also included ideas on how to feasibly carry out the process of drainage construction in terms of people mobilization and workforce contribution, together with potential strategies for costs' reduction, and proposals about possible government's contribution (mainly consisting in the provision of cement).

The sense of practicality of Vietnamese people was incredible and the process of mapping was extremely effective as revealed the technical expertise of farmers embedded in their everyday life, highlighting their livelihoods struggles when trying to manage the flood damage both over the agricultural land and their houses. At the end of the process, it was possible to organize a final conference in which community members presented their maps to local government. Officials were pleasantly surprised by the work done and very interested in the mapping methodology. The vice mayor of Vinh, in fact, valued the initiative proposing the implementation of map-making practices in the other communes of Vinh city. The paper maps stayed with the community leaders of the different villages for further use and elaboration and the feeling at the end of the process within the community of Hung Hoa was a general great sense of proudness. At the time of this writing, three years after the project, mapping is usually used as a tool of involvement within rural planning processes both by government and communities.

Philippines

The picture

The Philippines includes more than 7000 islands, clustered into three major island groups - Luzon, Visayas and Mindanao – with Manila as capital.

The country has a peculiar history in South East Asia having experienced five centuries of Spanish and American colonization. It is home to many different ethnic groups, languages, religions and traditions. Tagalog, officially named *Filipino* has been adopted as a lingua franca (Zorc, 1977) and English is spoken or understood by the majority of the population. The Philippines is among the world's fastest urbanizing countries and its overcrowded cities present relevant challenges (Collymore, 2003). In fact, approximately 70 per cent of the Philippines' population resides in cities, with an urban growth rate of four per cent a year. However, the spread of urbanization is not coupled with shared economic growth, as state policies focus more on wealth creation, rather than providing job places (JPP Report, 2014). Weak employment is one of the causes of poverty in the country, together with underdeveloped agricultural sector and high level of inflation. The country also experiences regional armed conflicts, with related people displacement, as well as natural disasters (typhoons, floods, landslides, volcano eruptions, droughts etc.) which affect its unstable social-economy. Environmental degradation, particularly in the poor urban areas increases the problematic living conditions. Like in many other cities in Asia, high level of rural poverty is pushing people into the cities while urban land is becoming increasingly valuable; there is no socially responsible land use policy in place and housing for the lower income sectors of society is a dominant issue (Ibid.). Of an estimated three million urban poor households, around 18 million people have no legal land or housing tenure (GLTN, 2012). Available land in many cities has been minimized over the years as since the 1970s much institutional and low income residential land has been transformed to commercial and industrial purposes. In cases where households are able to collectively afford land and housing, the drawn-out and complicated legal procedures on land administration can make this completely unrealizable (JPP Report, Veronesi et al, 2016). Therefore an enormous number of households live 'informally'; they rent within the informal land market, or they occupy government land, empty private property and danger zones such as coastal areas, riverbanks, bridges and railway tracks, without proper infrastructures and basic services (Ibid).

As a result the urban poor unceasingly experience tenure insecurity and evictions as well as associated high health risks.

The government runs a Community Mortgage Programme to supply low interest long-term loans for legally organized communities to purchase land at market rates and cover construction or improvement costs (both for on-site upgrading and relocation). In addition, a scheme of mid-rise social housing in urban areas recently started. The Philippines are characterized by a very active civil society and high level of people association, organization and networking at different levels. Various local NGOs and CBOs (Community- Based Organizations) are involved in mobilizing people on the ground, trying to make the most of these government's openings and opportunities, although with slow and problematic processes.

Fig 7. Bagong Nayong neighbourhood

Background

The Philippine Alliance is partner of ACHR and it has a fundamental role within the local context in promoting partnerships between poor urban groups and local government with the aim of sustainable housing solutions.

The Alliance itself is a partnership between five connected organisations: Homeless People's Federation Philippines Inc. (HPFPI), Philippine Action for Community-led Shelter Initiatives Inc. (PACSII), Technical Assistance Movement for People and the Environment Inc. (TAMPEI), Community Resources for the Advancement of Capable Societies (CoRe-ACS) and LinkBuild (Veronesi et al., 2016). Each of them has a role in the process of acquiring land tenure and designing housing solutions for informal settlers.

The CAN regional workshop in 2013 was hosted in Metro Manila.

The regional workshop involved architects, engineers, urban planners and academic institutions from across the CAN network in Asia with the participation of some young professional from Europe to share about community-led upgrading progress (JPP Report, Dovarch et al., 2014). The workshop' activities, involving participants in different areas of Metro Manila, were thought by the Alliance as an occasion of visibility of on-going community-driven processes and therefore workshop activities were organized in order to give a functional contribution to such people's efforts.

Mapping to be taken seriously

In Barangay area of Valenzuela City, Metro Manila the work was carried out in collaboration with Bagong Nayon Neighbourhood Association (BNNAI). It was six days of intensive work exploring with the settlement's dwellers an alternative plan of re-blocking upgrading which could satisfy government's concerns of fire safety and density, even if not necessarily comply perfectly with official standards imposed by local authorities. The idea was to show to the government the real needs and conditions of the settlement as well as demonstrating that planning is not only related to a subdivision scheme made on the base of standards requirements, yet a complex process in which many other aspects need to be taken in consideration. Furthermore, people lived in the area for many years and most of the houses had been self-built of bricks. For the mapping process a settlement's map already existed, elaborated by an engineer hired by the community some time before. It was supposed to be the working base, however people quickly realized this map was not accurate, containing many mistakes and lacking of precision, particularly in how it represented the more dense areas with maze-like alleys and complex housing structures. After discussing with the community they realized the need of having an accurate map to work on, when proposing viable and convincing

alternatives plans to the government. From that moment, the entire settlement, 352 households, was involved in a very careful re-mapping process; not only the leaders of the community association as it happens most of the time, but the majority of the residents as well. Some of them had their house-measures written on their hands when they came to the courtyard where the map was located.

Fig 8. Measuring houses and roads, mapping and meeting the Mayor.

They transferred the measures to a grilled paper, cut their "house-square", put the name of household and positioned it on the map. They all learnt how to measure their houses and how to represent this information on a scaled map. Also, a group of young people was in charge of measuring streets, alleys and footpaths within the settlement. It was hard work but all the residents were amazingly committed, and perfectionist about the details, working overnight to finish the map within the workshop. During the mapping activities we also discussed with the community what kind of alternatives we could propose to the government. It was used a satellite image of the settlement which gave a right perspective to the people in

order to plan possible interventions. The government requested to the locals the enlargement of the main road whose width ranged from 4.5 to 5.5 meters. The first official requirement was of 8 meters but the Bagong Nayon Association already negotiated with the government a decreasing to 6.5. Anyhow, the intervention provides for a significant impact on the houses located along the main road as they had to make them smaller by one to two metres. Analysing the reasons of the government request, people understood the importance of accessibility in the settlements (as at that time it was possible just through the main road), particularly in case of fire. The solution proposed by the community was to negotiate for a "swap agreement" in the southern area of the settlement where several encroachments occurred. As the encroachments are mainly by factories and since the community is in the process of acquiring the land which includes those encroachments, they wanted to give the factories the opportunity to leave their compounds where they currently are, yet ask them to get in return two or three exit ways through the occupied areas. At the same time they agree to slightly widen some of the alleys (for achieving at least 2 meters) and "cleaning" them in order to make the transit easy and fluent. Finally they identified several places across the area where to set water supply systems for fire protection. This information and plans were all showed in the settlement's scaled map.

Professional and not professional experts

It was evident that even expert engineers with related technologies are not able to map properly without the participation of the locals as only community members have the necessary depth of knowledge and orientation capacity within such extremely dense and incredibly labyrinth settlements.

The proposal coming out from the activities suggested a first phase of community-driven mapping process and a second stage in which involving professionals for adjustments and maps' digitization. The mapping activity made the community aware about different scenarios of intervention particularly in terms of number of houses affected and cost estimation. Indeed, one of the priorities of people was to make proposals which could minimize the damage and respect people affordability, as well as getting the support of the government in financial terms while contributing through their saving schemes. During the mapping workshop a rewarding moment was when the mayor of Valenzuela visited the settlement. The community had the chance to use their map to communicate their plans and

proposals, showing their commitment in respecting the norms in addition to their effort in finding alternative solutions which could meet their needs and settlement's conditions.

Fig 9. Community's final map

The CAN Regional Workshop concluded with a Memorandum of Understanding signed by mayors and people's association which opened a dialogue for further collaboration towards comprehensive urban upgrading processes.

Part Four

Approaching Geographic Information Technologies

"The only source of knowledge is experience."
Albert Einstein

Reflecting on the ground work

The mapping process in Hung Hoa Commune in Vetnam was definitely successful. However, the final output of the mapping process appears, in hindsight, not really effective. In fact, even if it was definitely rich and valuable in technical and social terms, the paper hand-drawn maps and related contents could be optimized. Although community leaders effectively presented government representatives with the mapping process and related information stimulating great interest, the chance to use the precious information and local knowledge contained on paper maps by officials and potentially by other professionals, was probably limited. Hence, the idea at the end of the Vietnamese fieldwork was that perhaps digitizing information through the integration of community map-making with geographic information technologies would have allowed a representation and communication of the data gathered and the design proposals developed by people, in a form which technicians and policy makers could find more authoritative and, most important, more manageable and functional to planning processes. Also, in this case, the Vietnamese farmers demonstrated adequate expert knowledge which could be easily turned into a technical contribution to design, and the engineering issue treated was particularly suitable for being elaborated on geographic information systems (GIS) potentially allowing further analysis.

Experimenting the digitization of people's paper maps

Personally, being a sociologist without any technical expertise, the process of acquiring a basic knowledge of GIS and exploring its capabilities, was an interesting experiment. The objective consisted in exploring information on paper maps and understanding whereas these could be digitized without losing the fruitfulness of the face-to-face process. Moreover, there was the need to first-hand working through the software in order to evaluate what the digitization process requests in terms of competences, resources, conditions, time etc. This was made

with the perspective of exploring the integration of GIS and people-driven mapping practice in the field. Although the mapping activity in Vietnam was supported without any intention of post-production in terms of digital elaboration, the pictures of the people-maps we took from above were sufficient to allow the digitization work. It was doable, in fact, the digital image rectification and the geo-referencing process both of hamlets' maps and Commune's map photos. Then, these have been overlaid on an orthophoto and cadastral map of the area (files received from the local government during the fieldwork). By this, it was possible to trace on-screen the information participants drew onto the maps to get the data into the GIS, 'populating' a geo-database and creating related thematic maps. While digitizing, it was intentionally represented the community's point of view. For example the layer map regarding the impact of the flood on the different villages was called "Flooding community experience". This was made with the purpose of possible interaction between information coming from daily life and scientific data obtained with technical equipment. Other features digitized regarded the resources identified by local community as their main sources of income or considered important for life quality (such as rice fields, aquaculture, Lam River, forests, sedge fields etc.); the environmental threats and associated supposed causes; the existing sanitation infrastructural system with related malfunctioning. Obviously, it was entirely displayed the drainage scheme planned by the locals, both for specific hamlets and for the whole commune, classifying ducts and channels in: existing in acceptable condition; to be necessarily built; to be upgraded and to be considered for construction. Finally, a more 'social layer' was dedicated to the community 'good precedents'. These refer to the community organization initiatives (such as the diffused saving activity and the ways money was used for collective intents); the 'safety system' set up internally to safeguard the agricultural land through a turnover of voluntary 'guardians'. As well as the previous participation of some Hung Hoa's community members in other small projects promoted by ACCA program, such as roads' widening to meet official standards, or community centres construction. All this information was added to the GIS database with the aim to show existing potential within the community in terms of self-organizing and sustaining since this is considered an important requirement for loan allocation by the CDF. The difference between the previous ACCA projects in Vinh and the one in Hung Hoa, was the use of mapping methodologies and the involvement of people in planning big infrastructural systems using their own expertise. The GIS maps allow

an immediate understanding of what the community prioritized and of the area's features, with respective constraints and potentials.

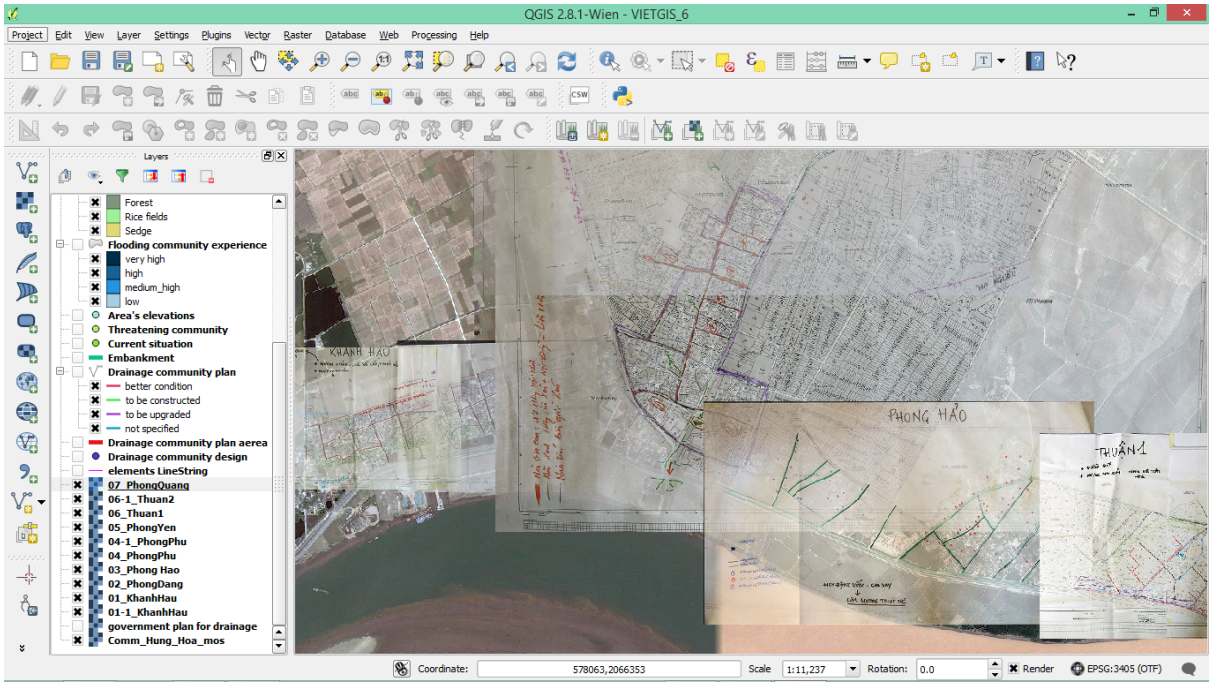


Fig 10. Geo-referencing people maps on GIS

During the mapping sessions, Vietnamese people rightly talked their own language and, even if we had the young translators, most of the time the contents of discussions stayed unknown to us. While translating the map's legends and then digitizing information on GIS, many things became clearer in my understanding. For example, it was interesting to compare the land elevation data of the area on Goole Earth and realizing that people, without any technical equipment and just through their direct experience of the flood, they perfectly located where the water flow deviates its course and therefore changes direction, by collocating throughout the map the related indicative arrows.

Interesting information from the locals was about the effects that the various embankments constructed by the government around the area had on the flooding. Many of them reckoned that the situation worsened rather than improving as supposed. Consequently, they attached great importance to the representation of the embankments on the map.

To my competences it is hard to evaluate whether people are right or not, anyhow this could be a thought-provoking question for expert engineers. At the moment indeed, it would be possible to communicate Vietnamese people's data to a

hydrologist or environmental engineer for technical elaborations, as well as cross-referencing these data with official ones.

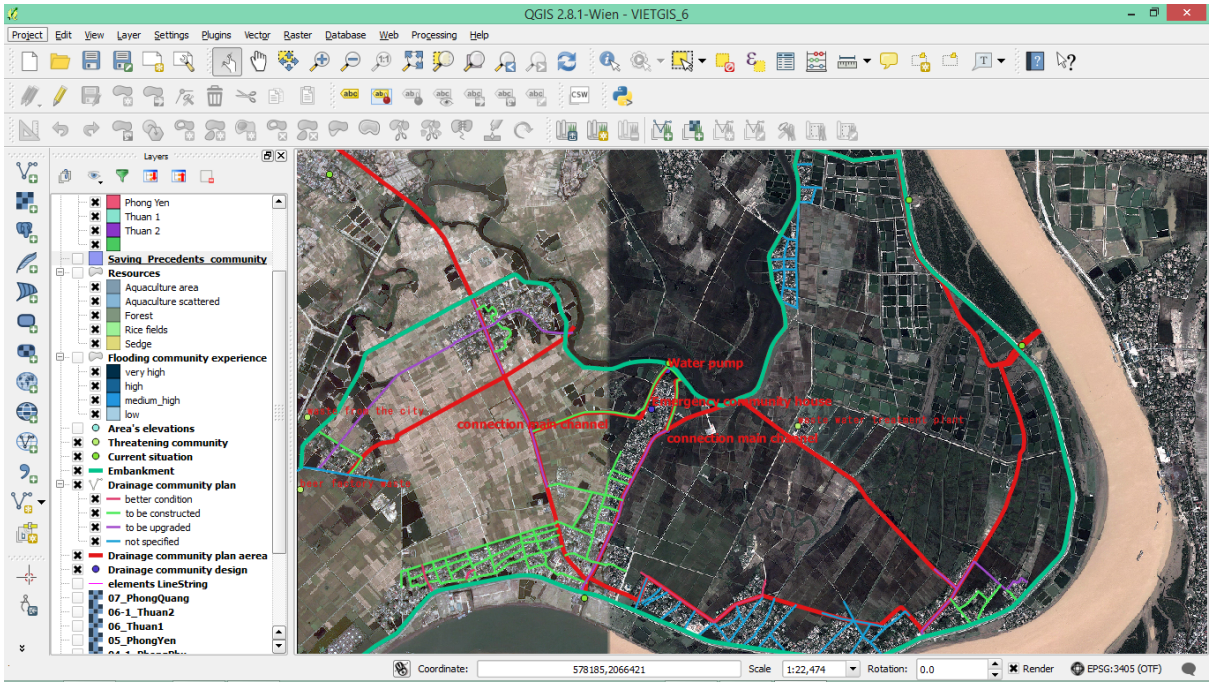


Fig 11. Digitizing the drainage system of the Commune from people maps

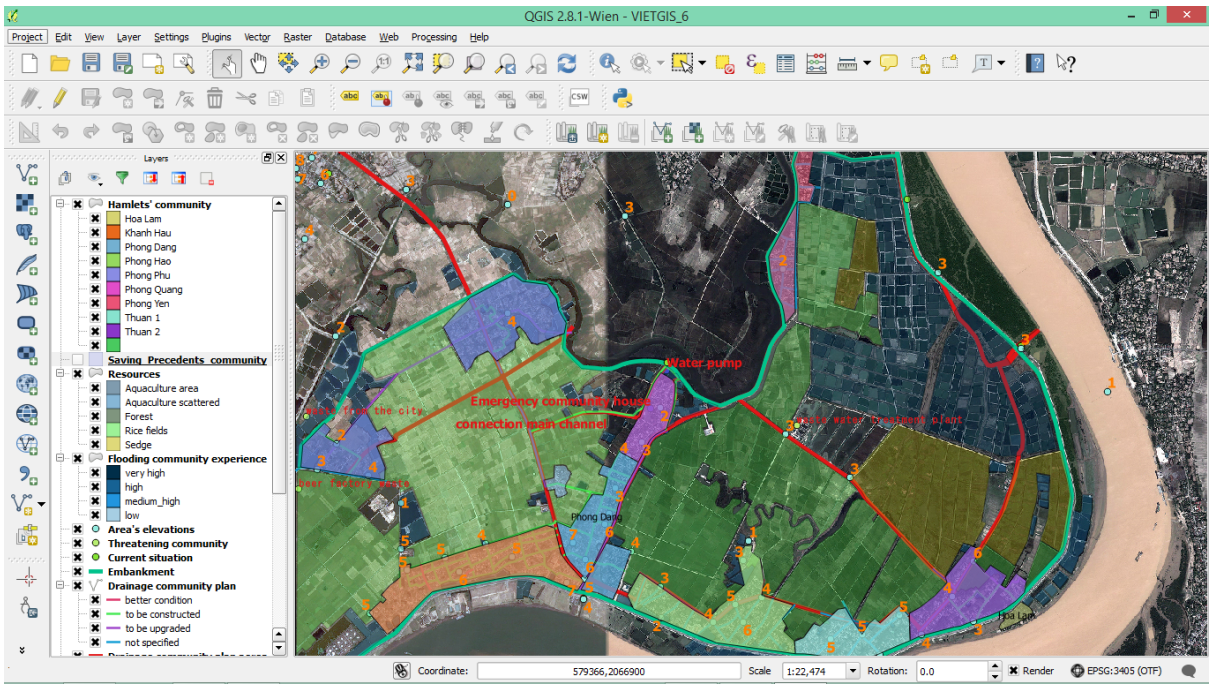


Fig 12. Digitizing resources from people maps

Although the drainage system was the *fil rouge* of the entire mapping process, generally the data and information gathered unfortunately lack of consistency. The nine villages indeed developed maps in different ways, some with more focus on certain details than others.

For instances, in one of the hamlets participants developed detailed costs estimation for the construction and drainage upgrading in their village; a work the other hamlets did not elaborated. Also, information on the saving activity was more detailed in some villages and less in other. This is a limitation for the GIS software as only thereby data's coherence cross-cutting analyses of the different issues affecting the area are possible.

At the time of fieldwork, we wanted the mapping being people-driven hence we tried to interfere the less as possible in the process and we did not have in mind a possible optimization of data. However, I realized in hindsight that if we have had the post digital elaboration on our agenda since the beginning, we would have supported and guided people differently.

Participatory GIS

Participatory GIS (PGIS) originated in the 90s with the idea of emphasizing community involvement in the production and/or use of geographical information systems (GIS). "A participatory GIS celebrates the multiplicity of geographical realities rather than the disembodied, objective and technical 'solutions' which have tended to characterize many conventional GIS applications" (Dunn, 2007, p.616). The idea was to integrate diverse forms of information to promote social learning and broaden participation among unprivileged groups across socio-economic contexts, locations and sectors (Rambaldi et al, 2006). The practice is the result of a merger of some of the participatory methods already used in Participatory Learning and Action (PLA) with tools of Geographic Information Technologies (GIT). "A good PGIS practice is embedded into long lasting spatial decision-making processes, is flexible, adapts to different bio-cultural and bio-physical environments, depends on multidisciplinary facilitation and skills and builds essentially on visual language" (Ibid. p.2). Generally, for practitioners involved in PGIS, this practice has a significant potential for people empowerment in development processes; its utility is widely recognized, since contributing in building legitimacy and advocacy from below. PGIS has been adopted worldwide in urban planning, revitalization, natural resources management and preservation,

urban settlement upgrading, conflict management, land access, service access etc. Different approaches have been developed and applied both in the North and in the South, known under a variety of abbreviation including, among others: Public Participation GIS (PPGIS) (Craig et al., 2002); Community-Integrated GIS (CiGIS) (Harris & Weiner, 1998); GIS for Participation (Cinderby at al., 2014); Mobile, Interactive GIS (MIGIS) (McKinnon, 2005); GIS in informal settlements (Abbott, 2003); Participatory 3D Modelling (P3DM) (Rambaldi & Callosa-Tarr, 2001; Rambaldi, 2010). Although evolving in different ways, all these approaches share the same idea of placing ordinary people in a position to generate and analyse geo-referenced spatial data, integrating multiple visions and diverse kinds of information (Rambaldi, 2010). Some of them, such as CiGIS and GIS in informal settlements, comprise the adoption of traditional participatory methods (transect-walks, focus groups, interviews with households, questionnaires etc.) during the diagnosis phase, assuring the gathering of data directly with and from the community and successively inserting information into spatial geo-database on GIS by the hand of experts. This means that the integration of information coming from local communities into GIS is preserved, however the process does not include the production of maps by people.

In other cases, the use of small format aerial photography - SFAP (Sliuzas, 2003) significantly helped to engage with communities on the ground enhancing communication and supporting discussion. In some of these practices orthophotos have been covered with transparencies laid-out, drawn by communities and successively scanned, geo-referenced and digitized on GIS by experts (Muller & Wode, 2003). In other projects, people were also provided with handheld Global Positioning Systems (GPS) allowing them to gather geo-referenced data to be then easily transferred into GIS by practitioners. As an example, high resolution satellite images and GPS have been used on-site with communities by the Global Land Tool Network (GLTN), a coalition of international partners funded by UN-HABITAT. They took up the mission of supporting the development of pro-poor land management instruments (such as the prototype Social Tenure Domain Model - STDM), to address the technical gaps associated with unregistered land (Lemmen, 2013). “The security of tenure of people in many areas relies on forms of tenure different from individual free hold. Most of register rights and claims are based on social tenures (…). This range of rights generally cannot be described relative to a parcel, and therefore new forms of spatial units are needed” (Ibid., p.4). The process consisted

in gathering land rights holders and government officials to work around 1:2000 scale satellite images determining together the boundaries of spatial units. After the field data acquisition, the images were scanned and digitized on GIS and brought back to the local community for projection on a screen and public inspection (Ibid). Another PGIS approach whose objective was to make people closer to technologies is the Mobile Interactive GIS. Through an equipment composed by a laptop with GIS, a roll-up digitizer and a video projector this method allowed the simultaneous use of sketch maps drawn to scale, their direct conversion to digital form and the displaying and projection of maps images, along with statistical graphics and pictorial information onto a large screen. The participants can participate through the roll-up digitizer, review the outputs projected on-screen and discuss. This allows a real-time interaction among locals, officials facilitators and GIS experts using at the same time different technical tools.

Generally, all these approaches described above have two limitations according to the perspective of this research work. Firstly, the collective hands-on people mapping practice is not always included or considered a prime step. Secondly, even when people mapping is part of the process, community members do not participate in the digitization phase and sometimes they neither have the chance to intervene after this phase for further check and control of exactness of data interpretation by experts as well as conformity of digital representation. Differently, 'GIS for Participation' and 'Participatory 3D Modelling' preserve and particularly value the people mapping process. Moreover, the digitization of the maps produced by inhabitants by the hands of experts (who in the case of P3DM often are local government officials trained on GIS by external consultants) is also included in these methodologies together with a validation phase to be carried out with local communities after the digitization. In the case of 'GIS for Participation' a further people mapping session is provided in which participants rework on the derived maps adding comments and new suggestions. However 'GIS for Participation' practice ideated by Cinderby and Forrester (2013) has been carried out mostly in developed world while P3DM was applied largely in developing countries. This is why P3DM became of major interest for this research work. Nevertheless, the reflections on practice by the initiators of 'GIS for participation' approach are taken in consideration within the research analysis.

Volunteered Geographic Information (VGI)

Recently, with the growth of technology for storing and sharing information and the diffusion of open-source online maps (such as Google Maps, Google Earth and OpenStreetMap), Volunteered Geographic Information (VGI) approach has emerged challenging PGIS in terms of speed, scale and representativeness (Verplanke et al., 2016). VGI, in fact is a broad term which refers to the sets of modalities and systems for gathering data and information coming from citizens, and which are based on Users-Generated Contents (UGC), Web 2.0 and the Geoweb through the use of Web GIS software (Ibid.). This means that through the simple use Mobile Phones (SMS) or Smartphones with incorporated GPS, people can contribute to creating Collaborative Web-Maps. These have become particularly relevant in circumstances which need both speediness and breadth in the communication of geo-referenced data such as crisis situations, natural and humanitarian disasters.

Also, as many disasters occur in places that are literally 'missing' from any map and the first aid responders lack the information to make valuable decisions regarding relief interventions, open and collaborative projects have been developed to improve this situation. One interesting example is Missing Maps, a network of different groups worldwide through which *Mapathon* workshops are organized to map areas where humanitarian organisations are trying to meet the needs of the most vulnerable people and areas (from Missing Maps website).

Collaborative Maps have also enabled the creation of digital activist movements as for example the Anti-Eviction Mapping Project in San Francisco Bay which aims at disseminate data about the dispossession of the area by its residents and contributes to a sort of collective resistance against eviction phenomenon (A-EMP website). Finally, Collaborative Maps have been created within specific neighbourhood or urban areas, both in developing and developed world, through gathering data and information directly from residents provided with handle GPS or Smartphones' applications. For example, within *Map Kibera*, a project in the largest slum in Nairobi (Kenya) groups of most active young dwellers have been trained in GPS technology and sent out to traverse Kibera on foot, using their bodies as tools to collect traces of the thousands of streets, alleys, and paths to generate the first-ever digital OpenStreetMap of this thriving community (Townsend, 2013). They also created *Voice of Kibera* a citizen-reporting website that used an open-source tool called Ushahidi (developed in 2008 to monitor election violence in Kenya) which plots media stories about the community onto the open digital map, and allows

residents to send in their own reports by SMS (Ibid). The initiative inspired another project named *Crowdmapping Mirafiori Sud*, a neighbourhood in Turin, Italy. Ushahidi application enabled local citizens to submit reports regarding physical and social problematic issues of their own neighbourhood, as well as positive aspects, using their mobile phones or Internet (Crowdmapping Mirafiori Sud website). In this way it was possible to create a geo-spatial archive of all the inputs coming from the locals while the online map entailed a fruitful platform of communication, dialogue and sharing of ideas between neighbourhood's inhabitants and Turin's municipal authorities. The process resulted particularly fruitful for planning interventions in the area and managing the requalification process.

In sum, VGI can be a useful and effective approach in many circumstances. Nevertheless, it is mainly based on individual contributions rather than collective; and generally it is based on the act of inputting geo-coded data through communication devises rather than entailing a process of collaborative hands-on practice such as people mapping. For this reason, within this research work the choice fell on other methods more closely related to the process of people map or model making.

Participatory GIS debate

Despite the variable levels of success of different forms and modes of GIS democratization worldwide, the pitfalls and constraints this practice encounters are many and the attempt to put "GIS into a technology with a social conscience" (Dunn, 2007, p.617) is quite controversial continuously navigating among criticism, optimism and frustration. One concern is that, being GIS historically and widely used in top-down spatial decision-making, its use in participatory processes could result in forms of co-optation and in doing this it could contribute to perpetuate hierarchical and established patterns. Another important question among scholars is whether GIS can be truly "participatory". How the deepness of local knowledge, the amount of qualitative data (culturally and socially meaningful), not always with spatial reference, not always precise, not always scaled, can be integrated into a GIS? How can the richness of people involvement be represented within such an exigent tool that is not designed to automatically deal with uncertainties or fuzziness? 'Capturing local knowledge in a GIS that relies heavily on the spatial geometries of points, lines, polygons and the quantitative ordering of information, is

not easy task' (Craig et al. 2002, p.247). Regarding this questions, McCall (2006) is convictive: "precision cannot always be considered a necessity in Participatory GIS, exactly because spatial reality is not precise: it is always fuzzy and frequently ambiguous, even discursive and emotional, although the degree certitude varies with the purpose of the PGIS" (p.119). With this purposes, innovative GIS and visualisation tools are coming into play handling 'imperfect data' capabilities. "PGIS is eventually developing the potentials to elicit and create displays of spatial knowledge and rich pictures of a multi-textured world" (Ibid, p.15). For example, McCall mentions possible ways such as layering issues and time; inserting fuzzy symbols; adding multi-media hypertexts or interactive hyperlinks; shading or blurring boundaries, representing flows and dynamicity and so on (Ibid).

Normally the attempts to render GIS more "social sensitive" come from professionals who are basing their intent on the "recognition that both quantitative and qualitative methods and information can exist in the same organizational system" and that "there is a room for a grounded contextualized and reflexive GIS", which "seeks to uncover local knowledge and power imbalances" (Dunn 2007, p.630). According to this idea, Sieber (2004) calls for a 'rewiring of GIS' that is "engaging the code and the coding directly, to build a GIS/2" (p.25). In other words, this means pursuing a less rigid geometry of the software and more opportunities for inclusiveness and representation of complexity and disagreement (Dunn, 2007).

In any case, the process of map-making, and the application of PGIS in particular, include questions of access, control and ownership of information, data and outputs. These issues are quite "sensitive" as when PGIS is adopted, it normally 'turns tacit knowledge into a public one' (Abbot et al., 1998, p.29). This means that knowledge moves out of local control and this could increase undesirable visibility igniting latent (or creating new) conflicts, as well as providing governments and other stakeholders with free information (Fox et al., 2006). This, depending on the context and local dynamics, could augment pressure from outside on local communities (Abbot et al., 1998). In some cases, it could be counterproductive for people struggling for their rights if not taken into account appropriately and with great responsibility. At the same time, 'being on official maps' and having ownership of information is vital for people living on the margins and/or in vulnerable conditions, in order to get recognition, have voice, to scale their process up and augment their bargaining power.

This is why it is extremely important that information generated through mapping and GIS data elaborations is accessible and available to all local spatial knowledge holders and, most of all, selectively opened to the outside world (Ibid.). The work on the ground needs to be strategic and the tools involved in the process ethically and consciously adopted both by professional and by community members themselves (Fox et al., 2006). Local communities involved in mapping process and particularly those including GIS use, should be made aware from the beginning of the tools they are using, the power they embody and the possible unintended consequences of their work on visual representation of territories. Even if this means deciding not to map in certain moments, as it could be counterproductive for local communities in too vulnerable conditions or within particularly disabling institutional frameworks. Moreover, in case of mapping people should be set free to decide about placing or not, protecting or disclosing their spatial data. Practitioners facilitating the process have the responsibility to explore together with people purposes and objectives of the mapping activities in the perspective of influencing transformation; strengths and possible drawbacks of the methods adopted. Also, they should analyse together all the possible implications of showing certain data on maps which potentially are made public, such as cultural sensitive data or data at risk of manipulation or exploitation (Rambaldi et al., 2006).

Participatory 3D Modelling (P3DM)

Participatory 3D Modelling is a participatory mapping process based on topographic information from scale maps used to collectively constructing a geo-referenced relief model which can be easily used by inhabitants to map their settlements and territories locating physical and social features (Rambaldi, 2010). While analysing vulnerability and problems, while identifying existing resources and potentials, people uncover inner capabilities and plan possible actions and interventions. The origin of the P3DM practice in the field of development seems to date back to early 90s in South-East Asia where models were first used as learning tools in Thailand's University and then as a communication tool for facilitating dialogue among indigenous communities and local authorities. Processes were spearheaded by researchers who, at that time, constructed the model and used mainly on issue related to land tenure and natural resource use and protection. In a little while people started being the makers of models, yet through a simplified 3D modelling process as models were produced using mud, powder, tree branches and

leaves (Rambaldi, 2010) reporting about a personal conversation with Forster, 2001). Since 2006, this method is promoted worldwide by the Technical Centre for Agricultural and Rural Cooperation (CTA) based in the Netherlands, a development agency mainly funded by the European Union and working in Africa, Caribbean and Pacific (ACP) countries. The methodology has been used with many purposes such as: documenting and safeguarding traditional knowledge; cooperative planning and collaborative research; management of natural resources and protected areas; participatory monitoring and evaluation; conflicts resolutions. In diverse areas of different countries, P3DM was adopted by NGOs, CBOs and/or local governments with great success. The CTA is strongly committed in training officials and NGO's operators on the P3DM processes so that they can subsequently apply the methods in their own contexts. The P3DM process includes different phases. Firstly, conducting a preparatory work called 'scoping phase' to mobilize communities, organize with local facilitators' team workshop and venue, procure base maps and materials for model's manufacturing.

Fig. 13 Participatory 3D Modelling in Kenya. Credits: Giacomo Rambaldi

Subsequently, the map legend is prepared with local stakeholders; the blank model assembled; the information and data depicted on the model; and the model

unveiled in formal events. The geographical scope of the model (which could be physical administrative, environmental, cultural, socio economic, territorial etc.) together with the most appropriate maps' scale to use, depends on the purpose of the mapping and needs to be decided collectively. The othophoto and contour map of the selected area serve as a base for the model's construction, whose process is divided mainly in: tracing the contours, cutting the cardboard of each land layer, pasting them one on top of each other and painting the entire relief surface with white paint to obtain a blank base model. Generally these steps are carried out by a group of young community members from high schools. Afterwards, the 'population' of the model with any kind of local features can start (according to the legend previously decided by community members), and diverse community groups are involved (respecting age and gender balance). Generally, it is proper to initiate with landmarks, then establishing links among them and finally develop a wider, comprehensive understanding and representation of landforms in relation to the issues treated and the purpose of the model.

A grid is also intertwined (usually thereby a yellow thread) and placed above the model to match the grid of the base map through letter/figure coordinates. The use of colour code and mediums (push pins, yarns, paper tags and paint) create a coding-system which renders a 3D model a rudimentary community-based GIS (Ibid., p.44). Once made, the model is tilted by 90 degrees and captured in sections through digital photography. The pictures can be geo-referenced as "raster images" and digitized on-screen. Data sets are added to a geo-database which can contain other GIS data (for example official data of the area) and the integration with different sources of information is possible as well as related complex analysis. Generally the method has demonstrated its efficacy in enhancing people capabilities; augmenting their bargaining power in communication and negotiation with government authorities and professionals; increasing their contribution in design planning and resource management and in particular, the potential of people map/model-making processes to become transformative path towards social change

Part Five

Participatory 3D Modelling in Western Samoa

Ua vela le fala.
The mat is warm[2]*.*
Samoan Proverb

The participatory construction of physical relief models is becoming a common practice in Western Samoa. Since 2012 a total of 19 Participatory 3D Modelling (P3DM) processes have been carried out by the local government together with local communities, contributing to planning climate change adaptation in the context of agro-forestry management, while generating a wide set of remarkable behavioural changes. From February to April 2016 I had the chance to conduct a research study in Western Samoa in collaboration with the Technical Centre for Agricultural and Rural Cooperation (CTA) and, through them, with the Samoa's Ministry of Natural Resources and Environment (MNRE). In particular the research focused on the capacity of this approach to generate deep-seated and long-lasting behavioural and related changes. The work consisted in a participatory evaluation of P3DM practice through a sociological perspective that directly involved diverse members of local communities and MNRE technical staff. The study's outcomes showed the transformative power of this approach at different levels and its contribution to the improvement of natural resources management and resilience within climate change adaptation programs.

The picture

A popular Samoan saying O Samoa ua uma ona tofi, which means "Samoa is a land where all positions have been allocated" (AsofouSo'o 2008 p.22) perfectly sets the country's scenario. Indeed, the extraordinary sense of commonality and order influenced by conventional land distribution in Samoa is mirrored in a unique traditional social structure rooted in ancient Polynesia and still incredibly topical.

[2] Samoan people use to meet and discuss sitting on mats within their typical community 'centres' called *fale* which are characterized by an oval or circular shape, with wooden posts holding up a domed roof, and without walls.
The spaces outside and inside these traditional architectures are integral part of cultural rituals. During community meetings, for example, both *matai*s and other socially legitimised participants, sit positioning themselves within the *fale*'s space according to traditional behavioural norms.

Samoan people are perfectly aware of their own place in society with related rights of expression, land entitlements and personal duties according to local customs. They respect fixed hierarchy and ascribed roles, and everyone, at all levels, refers to the traditional *matai* system, an indigenous leadership scheme which historically controls Samoa's socio-political affairs keeping communities profoundly cohesive and organized. It is fascinating to see how this grassroots social organization of *matai* system has persisted throughout time, offering a stable structure as of the present despite the European influence started in the XIX century and the Western principles became basic tenets of Samoan Constitution after independence in 1962.

Fig. 14 A typical *matai* meeting painted on the Catholic Church's dome in Apia

Samoa is de facto a Parliamentary Republic and the balance between the two different systems of authority in force, represented by western democratic values and ranked indigenous institutions, is still a dilemma for many scholars nowadays. However, the habitual Samoan course of life is far from conflicting and it keeps going smoothly through socially legitimized power dynamics, consolidates procedures and shared values, apparently without interrogatives or uncertainty. Participatory processes in this distinctive social milieu can be understood only

through an attentive contextualized analysis. First, because social dynamics and structures are truly complex and rooted in ancient customs and secondly, as participatory tools are adopted to involve communities in natural resources management, which directly connect people to their own traditional possessions specially due to the fact that 81% of the country territory is customary land.

Background

Since its introduction in Fiji by CTA in 2005 P3DM has been widely used in the Pacific region. A 5-year project (2011–16) named 'Integration of Climate Change Risks and Resilience into Forestry Management in Samoa' (ICCRIFS), funded by the Global Environment Facility (GEF) and executed by the Samoan Ministry of Natural Resources and Environment (MNRE) with support from the United Nations Development Programme (UNDP), was the first to use this method in the country. During the project's implementation, P3DM attracted the interest of several MNRE divisions and government agencies, which resulted in P3DM being replicated within other projects.

Fig. 15 People pointing their villages represented on the relief model made by them. Credits: Paulo Amerika

For example, P3DM has been included in a UNDP project executed by the Samoa Tourism Authority, 'Enhancing the Climate Resilience of Tourism-Reliant Communities in Samoa', and within a Food and Agriculture Organization-GEF project also implemented by MNRE's Forestry Division, named 'Forest Protected Area Management'. The main purpose of the project was to reach communities with sensitization about climate change and above all get their collaboration in implementing mitigation measures to reduce vulnerability. Their collaboration in this realm was fundamental as, being most of the country's territory customary land, the implementation of actions is in the hands of communities which are the actual land owners. Moreover the spheres of intervention addressed were diverse ranging from agro-forestry and water resources management; diversification and resilience of tourism activities; to livelihoods sustainability particularly of communities living in and around natural protected areas. The success of the tools used in P3DM process, in various contexts and with different purposes demonstrates its great flexibility and adaptability.

Mobilization and community attitude change

Community mobilization by MNRE occurred through a consolidate routine of sending formal paper invitation for 'consultation' to the high-ranking *matai* of each village through the mediation of the Ministry of Women Community and Social Development (MWCSD). This ministry was not involved in the participatory process itself, but it is the only one allowed to communicate directly with communities, that means with the *matai* leadership. During the consultations, the government presented community leaders with information about P3DM and invited them to be a part of the process. Once back in the village, the leaders met with other high and low-ranking *matai* to decide whether they would accept the government's proposal or not. After the community leadership agreed, they informed the government of their availability and chose other community representatives. These selected representatives, together with the *matai*, are the main participants of the model-making process. From an outsider's perspective, this highly structured mobilization process could be seen to undermine the meaning of 'participatory' and its open, sometimes spontaneous, and most of all democratic nature. However, in the Samoan context, this kind of interaction among actors influenced by social rituals was the only way possible to approach communities. Moreover, there are several local aspects which actually constitute a good foundation for community

involvement even through this structured mobilization. These are: the easy information diffusion at the community level, the strong social cohesion and the general community's 'common sense'. Samoans are used to working collaboratively and discussing decisions collectively, while they deeply respect both the indigenous leadership system and the government. Within this generally favourable environment though, the use of P3DM contributed to alter positively some dynamics that instead were counter-productive for participatory practice. All the government officials interviewed, in fact, talked about an initial very passive attitude of community representatives during the 'consultations'. Prior to P3DM officials adopted a lecturing-style in the meetings with communities, normally with Power-Point presentations, and information leaflets without any success. When MNRE staff first talked about the possible participatory mapping activity and the potential process of 3D model construction, people suddenly started listening and changed their attitude. However, many leaders initially thought that the government wanted to map their land to get more information and take it over. A few persisted with this belief so they decided to not take part, but most of *matai* gave P3DM a chance because, they said, were very attracted by the opportunity to build a model of their lands together.

Fig. 16 People populating the 3D model. Credits: Paulo Amerika

The opportunity offered to community members gave in their view the chance to express their local vision on their own place of living and to actively take part in a resources management process which could bring benefit to their livelihoods, so this stimulated their interests and attention. This people change in attitude triggered by P3DM, and their consequent availability to collaborate, resulted particularly important for the government to initiate a pro-active dialogue with them. The mitigation of environmental hazards generated by climate change needed a series of adaptation measures which implementation would not be possible without an active community involvement. Firstly, as adaptation measures generally need a high sense of awareness among people in order to be sustained in the long term, secondly as only a community-driven resources management can be effective in such a rooted customary land.

Model construction and change in perspective

The 3D model construction was, everyone agrees, an amazing and useful experience. Even though when people started populating the model some conflict arouse about village boundaries, the possibility to look at the territory as an eco-system prevailed, and people started 'thinking beyond borders'. Feedback from the community gives evidence on the effectiveness of P3DM practice: "we thought we knew our land as the back of our hand but thanks to the model we were able to learn much more". Community members stated that P3DM allowed them to better understand distribution of resources such as springs, water courses and different types of forests. They were able to identify, physically locate and evaluate their territory's vulnerabilities and potentials, and understand why and where mitigation measures were required. The presence of experts from different MNRE divisions such as Forestry Division, Disaster Management Office and Water Resource Division during model-making, contributed significantly to the learning process. In particular, people developed a clearer understanding about spatial-temporal interrelations between causes and effects within their own territories, and were able to visualise current and potential future impacts of their actions. They realised that they played a central role in environmental protection and that changes in their behaviour could increase quality of life in the long term while reducing the risk of disasters. For example, cattle farmers learned how important it was to keep their livestock away from springs and streams, and the community realised the consequences of environmental pollution such as throwing rubbish into rivers.

Communities identified the edges of nature reserves and the extent of flood prone zones, and became conscious about balancing forest preservation and agricultural land productivity, both in upland and lowland habitats. Together with MNRE's technical team and using the 3D model as a reference, communities planned and then implemented several interventions: they established intercrop plantations in collectively-managed agroforestry plots for village consumption, sale and export; put up fencing to keep livestock 20 metres away from rivers; built water catchment and water delivery systems; and constructed and managed several nurseries. In collaboration with the Samoa Farmers Association which actively supported the initiative and all intervention activities included farmers' training.

The process of model-making and consequent collaborative implementation of actions triggered another important change in people's behaviour. In fact, the introduction of an 'eco-systemic perspective' through P3DM process immediately called for an integrated approach of community engagement and management, which is fundamental in the development of a deep-seated environmental awareness.

Mutual learning and model custody

Elders and youth had the chance to dialogue around the model allowing inter-generational knowledge exchange on nature, culture and history. The learning environment did not involve only community members, but also the government officials themselves. They admitted to ignore some of the information that came up from the people, mainly related to cultural aspects but also to traditional techniques both in fishing and agriculture as well as some 'secrets' related to local biodiversity. For example, during the model construction came up that there is a little known fish species called 'aa' in Samoa which can be found only off the beach of one specific village.

Moreover some government members learned for the first time the origin of traditional Samoan says with many of them strongly related to physical environment. Another important source of knowledge from elder's involvement was the identification and location of toponyms, ancient place names related to indigenous narrative and local history. This permitted to visualize on the model the local "bio-cultural diversity" which Maffi and Weiner (2010) defined as the strong and rich contextual interlinkage between culture and nature.

Fig. 17 Visiting farmers and their nurseries, agro-forestry intercrops on demo-plots and water catchment systems. All implemented after P3DM

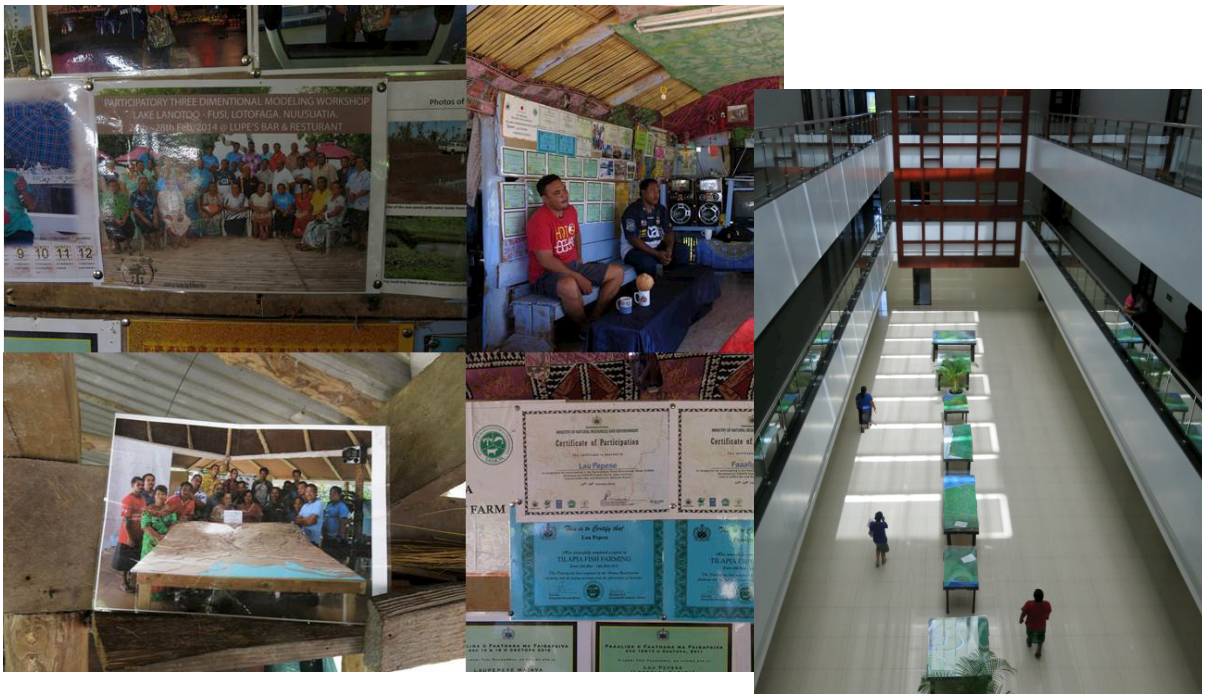


Fig. 18 P3DM certificates and pictures showed on the walls of farmers' houses. Models stored at the government building

The given value and the sense of pride that people developed towards the relief models are extraordinary. It is quite common to find the P3DM certificate of participation hanged on the walls of farmers' living rooms, positioned among important family pictures and religious icons. The model expresses in different ways the community sense of belonging to a specific territory, so people matured a sense of ownership of it which sometimes made its custody contentious. Within ICCRIFS the involvement of numerous villages within the same project sites, and the size of models often too big to be moved easily around, turned into a debate when deciding where the models should be kept. Certainly all villages involved had the same right to safeguard the model and they could not find an agreement. As a result, the models have been stored in rooms or along corridors of government buildings. The idea was to wait for people decision, meanwhile showcasing the models as physical evidence of people's participation and, in theory, make them accessible to everyone. However, during the participatory evaluation with community members involved in ICCRIFS, people highlighted the 'absence of models' in their villages, the importance of keeping them for planning and management purposes, and the need to have them readily accessible.

P3DM processes under the Small Grant Program

The positive effects of P3DM generated great interest among adjacent villages to ICCRIFS project sites, particularly from the communities that had initially refused to be involved. While ICCRIFS did not have the financial resources to conduct additional P3DM processes, the communities were encouraged to pursue alternative funding options, such as UNDP's GEF Small Grants Programme (SGP). Leaders from two villages, Faleaseela and Letogo, jointly presented a P3DM project proposal to SGP and explained their objectives and budget. The application was accepted, the grant was assigned and community representatives were able to directly manage funds for the model's construction and for the implementation of resulting actions. This was different from ICCRIFS and other MNRE and STA projects in which the financial aspects were managed by the government. The two villages operated independently but both asked for the technical assistance of MNRE team; this allowed the models to be manufactured and kept by the villages. Some feedbacks from communities' members, demonstrated the importance of this opportunity. In both villages, not only the *matai* and the main representatives participated in the process of model-making, but also other 'untitled' members.

Also, after model's construction, the participants could show it to the rest of the community, so everyone was made aware of the process and its purposes as well as have a say on model's features.

In Letogo village the model is used as reference during community meetings and discussions related to village social issues and land management and by local schools to teach children regarding their own territory and climate change. Moreover, as community representatives rotate often, the model is very useful for the new ones to understand the background of certain decisions taken within the community previously to their assignment and be aware of villagers' intentions for future actions. In Faleaseela village the model is based at Lalotalie eco-tourism resort and it is also used as 'orientation device' before tours to waterfalls and rainforests, as well as to show the location of culturally significant places. The P3DM under the SGP represents a very interesting example of a totally community-driven process. It proves the benefit of these modalities and it shows how a government initiative can turn into a bottom-up process and how communities can learn from each other improving practices during their course of action.

Fig. 19 One of the 19 3D models made in Samoa. Credits: Paulo Amerika

Relational, procedural and structural changes

Through P3DM, communities felt that the government had changed the way they related to people, from a 'teaching' to a 'listening' approach. They moved away from 'consultations' towards active 'participation' (Arnstein, 1969), generating relationships of trust with communities. Government staff visited the villages more often after model construction to support the implementation of actions, and became more collaborative and open towards people's requests and proposals. From the government's point of view, P3DM completely changed the attitude and approach of communities towards their own environment and land management, even when their behaviour was conditioned by cultural values and was harder to modify. For example, in Samoa, trees are cut down, not only for the provision of wood or agricultural purposes, but also because trees create shadows and a sense of oppression. Too many trees close together are considered by Samoans to impede the view of the sky and contact with God. According to officials, P3DM helped to sensitise people to the benefits of conservation and monitoring of forests, and generated an interest in natural resource management and a willingness to learn. These are all crucial conditions for effective implementation of programmes aimed at improving environmental management. Behavioural changes on both sides completely transformed the relationship between government and communities which resulted in other 'procedural' and 'structural' changes. P3DM is now indicated as a community involvement tool in various Management Plans of several government divisions (Forestry, Water, Urban Planning etc.). P3DM is also mentioned in the proposed new National Forestry Policy. The new policy, which is being approved by the government, also it addresses climate-change-related issues (that were not included before). Another interesting aspect is that P3DM has been also used in three Samoan schools (with one of them for special needs) to explain environmental hazards effects and sensitize children on climate change.

MNRE technical staffs are also collaborating with the Secretariat of the Pacific Regional Environment Programme and CTA in South–South initiatives aimed at promoting P3DM in other countries through peer collaborations with local governments. So far, the alliance has promoted P3DM processes in the Tonga, Nauru and Cook Islands.

Fig. 20 ACEO-Forestry of MNRE and other officials posing around a people-made 3D model. Credits: Paulo Amerika

An important precedent

The features represented on the model are geo-referenced and this means that they can be easily digitized using GIS software. This would permit a constant and easy updating, allowing layers overlapping and data integration for cross-cutting analysis, risks assessment and impacts evaluation or prediction. At the time of writing, 4 models up to 19 have been digitized by MNRE staff laying the foundations for this digital elaboration of P3DM data and related possible further developments.

The fruitful interaction between government and communities in Samoa is giving to this approach great authority while demonstrating its effectiveness and value. It is significant how P3DM embodies a real catalyst of change in many senses in the country and how it became so important that it seems no longer possible to do without it. Community participation in Samoa has the potential of becoming an essential and integral part of official procedures in planning and management processes.

Fig. 21 A typical Samoan *fale* where *matai* and other community representatives use to meet to discuss collectively.

Furthermore, the common conception of linear participatory processes normally classified as 'bottom-up' opposed to the not participatory 'top-down' is in a way subverted by the Samoan P3DM experience. In this case, in fact participation was firstly an initiative of the 'top' (the government) to reach communities on the ground and, afterwards, the 'bottom' represented by other communities asked for involvement and initiated new processes from below (as in the case of the SGP). In this sense, participation can be conceived as a circular concerted process, where actors from different levels (from the 'top' and from the 'bottom') inter-act meaningfully in a continuous and multi-directional collective cycle. In all these senses, the Samoan case represents a fundamental precedent in the field of community development. Firstly, demonstrating how effective collective hands-on approaches can trigger deep behavioural changes at different levels; secondly, proofing how this positive transformation of people relationships, attitudes and perspectives can generate other structural changes influencing both procedures and policies while contributing to institutionalize participatory practices.

Part Six

Participatory 3D Modelling in Nauru island

…from the diamonds nothing sprouts…
from the manure flowers grow…
Fabrizio De Andrè

A Participatory 3D Modelling process started in Nauru with a main ambition: to support the collaboration between government and community in building social and ecological resilience on the island. Nauru is passing through a process of environmental degradation and it risks of becoming a hostile place for living for its own inhabitants. Sustainable actions, through building community's capacity and awareness, are urgently needed for releasing this tiny Pacific island from future unhappy circumstances.

To support the intent, a Participatory 3D Modelling (P3DM) workshop was organized in April 2016 through a South-South initiative promoted by the Secretariat of the Pacific Regional Environment Programme (SPREP) in partnership with the Technical Centre for Agricultural and Rural Cooperation (CTA) and assisted by the technical staff from the Ministry of Natural Resources and Environment (MNRE) of Western Samoa. As I was working for MNRE in that period, I had the chance to be an observer in the P3DM Nauru first workshop for the manufacturing of the model.

The picture

After a century of uncontrolled extractive industry, added to economic recessions, failed investments and increased vulnerability due to the impact of climate change, Nauru people seems reacting, deciding to give a chance to an alternative future for this tiny and isolated island.

> For hundreds of thousands of years, when the island was nothing but a cluster of coral reefs protruding from the waves, Nauru was a popular pit stop for migrating birds, who dropped by to feast on the shellfish and molluscs. Gradually, the bird poop built up between the coral towers and spires, eventually hardening to form a rocky landmass. The rock was then covered over in topsoil and dense forest, creating a tropical oasis of coconut palms, tranquil beaches, and thatched huts so beatific that the first European visitors dubbed the island Pleasant Isle (Klein 2014).

Nauru is a small island made of 22 square kilometres landmass in the heart of the Pacific Ocean suffering a quite unique, complex and problematic both environmental and social condition. The island is made of a narrow and overcrowded coastal strip (about 50 to 300m wide and 30km long) and a central upraised plateau, called "topside" by the locals, which includes about 80% of the total landmass, ranging from 30m to 70m a.s.l. It is on this central area, once covered by a flourishing native forest, that a century of unrestrained mining activity has generated a deserted and ravaged landscape. Sun-scorched limestone coral pinnacles emerge from a punched and sinking ground entirely made of phosphate rocks. All around the vegetation is pretty absent, except from some scattered shrubs, while several mining structure in decay witness an industrial past. In the 70s, in fact, the first phase of phosphate mining and exportation, made the island tremendously rich. Customary law historically rules indigenous land rights and titles in Nauru so village's communities own the land, and this permitted one of the world's highest incomes per capita. Unemployment reached the 90% and for Nauruan people no efforts were necessary to get easily everything they desired: travelling every weekend for going to shop in Australia; babies' presents of millions of dollars; expensive cars and motorbikes; any kind of domestic appliance.

Fig. 22 The ravaged rocky inland of Nauru island

Today Nauru is one of the less visited countries in the world; 24% of the population, which totals around 10,000 inhabitants, lives below the Basic-Needs Poverty Line (UNDP 2013) and the 28% is vulnerable to falling into poverty. People are reverting to traditional livelihoods, at least those still possible, such as fishing and bird hunting. The current open-air rubbish dump is a heap of cars' wrecks and machineries' skeletons. The massive extractive industry, still operating for a second mining much less profitable than the first and coupled with limestone exportation, had resulted in the almost total loss of local biodiversity. Only Nauruan reefs are still quite healthy and high in abundance of species; however recent monitoring revealed uncontrolled overfishing and irresponsible pollution (Nauru National Report, 2014). Similarly, seabird species are harvested by the locals faster than they can breed. Apart from some recent minor initiatives on horticulture, there are not agricultural activities on the island. On the topside in fact, due to the mining exploitation, the topsoil has been mostly removed and the soil, too rich in phosphate and hence very high in salt concentration, resulted sterile. The island completely relies on importation for food supply and partially for drinking water as Nauru has very limited ground water resources (they started seawater desalination). The local population is steadily increasing and it is expected to double within the next two decades (Ibid). This is also due to the presence on the island of the Nauru Regional Processing Centre, an Australian offshore asylum seekers detention facility, where the refugees' statuses are processed according to the Australian Policy called Pacific Solution. Immigrants from countries such as Afghanistan, Sri Lanka, Iran, Myanmar, and Pakistan among others, try to reach Australia from Indonesia on boat but they are stopped before they can get ashore and transferred to Nauru in the refugees' centres. Most of the immigrants do not obtain permits to enter Australia and they have no other choice than trying to make a living on the tiny island. The availability of land for housing, though, is very low and the population density along the coasts is the highest in the Pacific. The population life expectancy on the island is decreasing. For every 1,000 babies born in Nauru, 29 die before their first birthday (Asian Development Bank website, 2014). Besides, half of the adult population suffers from diabetes type 2 as a result of a diet almost exclusively based on imported processed food. Simultaneously, climate change is affecting the small island: flooding on the low lying coasts mainly caused by rising sea-level, related erosion and severe droughts are all becoming

more and more frequent. In other words, the “living strip” of Nauru is trapped in the middle of pressures coming from the outside and from the inside.

Fig. 22 From top-left: sandy beaches characterized by rocky pinnacles; free refugees’ settlement on the island; inland mine area; dump site.

Background

Acknowledged this scenario, the current local government appears committed to address the issues of decline in Nauru. One of the main objectives identified is the rehabilitation, conservation and protection of terrestrial and marine ecosystems. To this end, Nauru was included in the Integrated Island Biodiversity (IIB) project funded by the Global Environment Facility, Pacific Alliance for Sustainability (GEF-PAS), implemented by United Nation Environment Programme (UNEP) and executed by the Secretariat of the Pacific Regional Environment Programme (SPREP). In Nauru the project is carried out in partnership with the Nauruan Department of Commerce Industry and Environment (CIE) and aims at implementing activities on the ground which use an integrated ecosystem-based management approach. P3DM was conceived within the IIB project as a supporting tool and the workshop

for manufacturing the model was held during one week in April 2016. The workshop was facilitated by a technical team from the MNRE of Samoa, some members of SPREP and the project coordinator of IIB project in Tonga. The development of the workshop faced serious logistical constraints as the Nauru's contour map and base map, which had been prepared and printed out in Samoa as in Nauru they do not have any functional equipment, got lost during the airplane journey from Samoa to Nauru. This drawback inhibited the process significantly, and the actual model construction took place just in the final two days of the workshop altering the planned course of events. Despite this, the unusual situation gave the opportunity to observe interesting local dynamics.

The P3DM workshop

The group of participants was quite small during the entire process, it slightly changed during the week but it never exceeded 15-20 community members which represented 0.2% of the total island's population. This was probably due to the fact that the preparation phase for the workshop was not properly organized, lacking in information diffusion and people mobilization. Moreover, the delay in starting the model's construction discouraged some of the people in taking part in the whole process. Nevertheless, the group was quite heterogeneous in terms of gender and age; it included a representative from a local NGO called Eco-Nauru and a member of a community-based fishery program. The workshop started one day later than scheduled and the first two days were used to draft the legend for the mapping session. Many of the elements that people (particularly the eldest) wanted to be included in the legend were related to local culture, stories and myths associated to specific places, historical events and social life. They were also really attentive to describe through the legend the coastal and marine areas' specificities raising concerns about the lack of seabed contours. The participants would have liked the model to include the bathymetry, but the government had not provided the needed data. It was a good opportunity for the community to push CIE for these data gathering which, according to government staff, is in progress and need to be concluded. Also, people were worried about the model's storage location after its construction and when some officials from CIE proposed to keep it in the government building, the representative from the local NGO said they would have made a request for custody, in order to make it more accessible to the local

community. The contour and base map was delivered at the venue on the afternoon of the third workshop day. Then, the actual construction of the 3D model started.

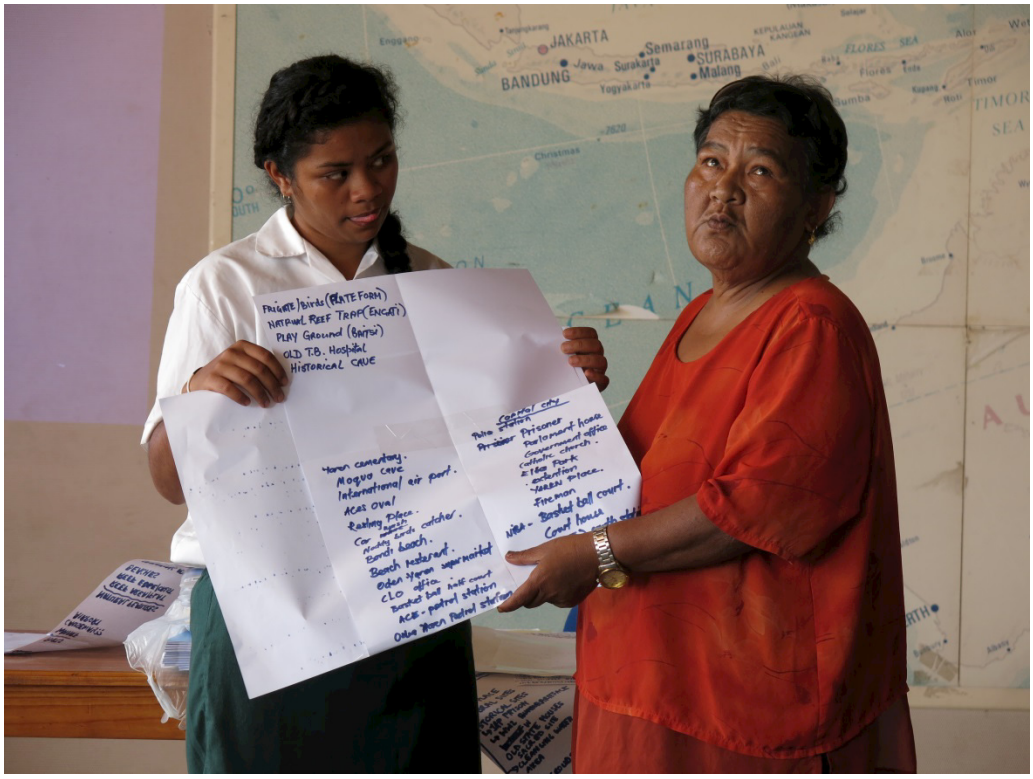


Fig. 23 Old woman and young girl constructing the model's legend together

It was interesting to see the youth, who stayed in the background during the elaboration of the legend, suddenly becoming active and dynamic.

The model to be made was quite large (2.50 x 2.60 m, scale 1:2,500) coupled with an extremely complex segmentation of land layers due to the mining activities. Therefore, a big effort was necessary to complete the work in less than two days. We stayed overnight together with participants, managing to complete the model on time.

Reflecting together on Nauruan social context

While working overnight on the construction of the model, the small group (in some instances of no more than 10 members) became intimate and it was possible to share some reflections. The participants agreed on the scarcity of people involved in the P3DM exercise and recognized it would have been necessary a more effective work on community involvement; not only from government side, but also at the community level itself. They acknowledged a lack of communication among their

own communities which makes this kind of initiatives hard to be inclusive. Listening to participants' reflections, Nauru's local society appears characterized by a very loose social fabric. In a way, decades of easy money influenced people mentality and enhanced individualism. Anyhow, in the last years education is spreading among the young generations; many locals are engaged in work to earn their livings; solidarity and mutual help are becoming part of daily life and all these dynamics are slowly contributing to create a sense of community. The arrival and, in some cases the settlement, of refugees did not help the existing social fragmentation as the relationship between locals and migrants, manly from Iran, Sri Lanka and Afghanistan, and hence with a very different cultural background, still need to be created. Nevertheless, those immigrants who remain in Nauru are, in the eyes of the locals, working hard to settle on the island and gradually integrating in the local context.

Fig. 24 People manufacturing the model; tracing, cutting, pasting layers and painting the model with white colour (they also used toilet paper between the cardboard and the paint to smooth the cardboard's edges and make the undulations of the ground more realistic)

Some participants acknowledged that the 'new inhabitants' are revitalizing the local economy. Most of them, indeed, are educated and usually quite skilled in craftsman like techniques and manual work (such as auto mechanics trade and handicrafts) that in Nauru have been completely disregarded during the wealthy heyday mostly characterized by a consumerist approach to life. However, in general the situation of the asylum seekers is desperate and there are many cases of violence, suicides and protests inside and outside the refugees centres, which significantly increase the social tension within the island.

The general impression is that Nauruan people are navigating between different conflicting feelings while talking about their home country. As Naomi Klein (2014) pointed out in her article *Beyond extractivism*, they appeared affected by the psychological distress that Australian Philosopher Glenn Albrecht defined "solastalgia", "the homesickness you have when you are still at home". In particular, on the one hand they miss the wealthy time during the phosphate industry when their living conditions were better than now; while on the other hand, they dream about the flourishing and healthy environment that the extractive activity incautiously destroyed. These contrasting feelings move people mind and generate reactions influencing locals' predisposition towards constructing approaches and alternative solutions. Positively, people are realizing that resources are not infinite and environmental care is the essential pillar for life sustainability.

The 'green' topside

In the morning of the last day the model was "blank" and dry, so ready to be populated. People entered timidly in this phase, they seemed scared to start and they searched for inputs. The Samoan team left them the initiative but they made the example of the Samoan case where people usually decided to start from a green base (painting with green on top of the white), and then used different colours to enrich the model with information related to environmental issues. The reason of this choice is due to the fact that Western Samoa presents particularly flourished vegetation all over the two islands, being both covered by tropical forests in lowland and upland.

Yet, the case of Nauru is evidently different. However, surprisingly people did not think further and started painting the entire island with green colour. Some youth were invited by the facilitators to prepare the other colours to represent features according to the legend, in particular the light brown to show the extensive mined

topside. But people did not use that paint for the inland plateau. After the green painting, people took the flags with features' names that the young girls prepared while the model-making was in progress, and participants kept populating the island' borders. The model was left completely green coloured, showing district boundaries and then houses, schools, churches, infrastructures and government buildings, cultural and historical sites; all along the narrow coastal strip. Just two little flags, added at the end, in the wide central part of the island: one said "mining" and the other one, not exactly located, said "refugee camps". It is hard for an outsider point of view to understand the underpinning reasons of this choice. One could jump to hasty conclusions and think Nauruan people do not want to face the reality. Instead, it would be probably proper to reflect on the specific case of this P3DM process. Firstly, the model-making and its population happened in a short time, less than two days, hence perhaps people did not have the proper time to represent everything on the model. Also, the local group involved was small and the discussion on features' representation not enough rich to be able to comprehend the different perspectives and forces operating on the island's realm. In any case, we need to consider that Nauruan people go very rarely on the topside. The central upraised land is not visible from the coastal plain as a narrow fringe of plants delimiting the coastal line hides the ravaged inland. Moreover, due to the presence of Australian refugees' camps and the second mining activities, the access to the inner part of the island is limited to the locals. In other words, the mining area is not part of people normal course of life like it is the coastal strip. They do not feel any sense of belonging related to the topside and therefore this territory seems not be important to them in terms of local identity. This might be the reason why they did not give much attention to its representation on the model, even if this portion of land is so much relevant both geographically and environmentally. Furthermore, it is also possible that the example of the Samoan 'green base' persuaded Nauruan people's choice. In relation to this, it is important to note that, during the process, facilitators should be able to guide the model's construction and population explaining the steps to follow and supporting the process, without influencing the contents and the modes of representation. A final hypothesis might be that the "green" colour all over the island represents a memory of a pleasant past to which in some way people aspire to come back, a goal to achieve in the future, a way to represent an imagined "dream island".

Fig. 25 People populating the green model

The potential of P3DM in Nauru

The P3DM exercise in Nauru was definitely a first step of a long path, a way to start a process towards generating positive changes. Due to the lack of time and the low number of participants in the workshop, the model is still incomplete but the P3DM approach has, in the island's context, a promising potential. First of all, most of the features represented on the model so far, are related to cultural specificities and historical sites. This reveals how the current fragmented social structure in Nauru generated in its inhabitants the need to re-define local identity through the rediscovery of traditional values and customs. The workshop represented an initial opportunity for kick-starting this process as the intergenerational exchange has already contributed to the model.

Indeed, the representation of cultural and historical sites such as healing pools for rheumatic and abdominal pains; clean sins rocks for restless souls; old prisons and war bunkers; burial caves and secret places transformed the model in a lively "storybook" that involved the attending youths in a fascinating time travel. Also, the workshop demonstrated how people can interact and get to know their own territory through the model. During the model-making, in fact, the young

participants learned for the first time the morphology of their island. The elders compared the land altitude to the past, realizing with sorrow the significant loss of ground due to the mining excavation. Moreover, all the participants could realize how close the open dumpsite is to the only water body on the island (called 'lagoon' by the locals) and the impact of waste on water quality.

Through the model it was possible to look at the entire territory from above, useful to create the needed systemic perspective which is particularly important when exploring the various inter-links such as causes-effects relations among land, sea and people. It can be used to analyse problematic matters, to understand impacts and adopt measures. In particular, for those issues which request a physical reference to be properly addressed, such as establishing terrestrial and marine conservation areas to protect endemic species; supporting action plans for the topside land rehabilitation; or while defining a program for the waste management. In sum, the role that the model can play in gathering people to work together, uncovering traditional knowledge can be fundamental to generate a social conscience and environmental awareness. As we know, environmental sustainability never comes without a sense of responsibility towards social and natural systems.

Next possible steps

On April 16th the 3D model was unveiled in front of the President of Nauru Republic Hon. Baron Waqa. He appreciated the P3DM work and promised to organize further thematic sessions, inviting more community representatives from different districts as well as other stakeholders to keep populating the model. For example, he mentioned the technicians from the Nauru Rehabilitation Corporation (the contracting agency in charge of land rehabilitation under the government's Nauru Phosphate Authority); and also the Australian officers from the refugees centres, as well as staff members from the various government's divisions. Generally, the need for a different approach in Nauru, starting with sensitizing community members and land owners on island's priorities, seems acknowledged. However, at present people know very little about government commitments and programs and without information and capacity building at the community level, it will probably be really hard to implement any action. P3DM can represent a very effective medium for the multiplicity of actors who very differently operate on the island, offering a base of reference and a common tool of analysis.

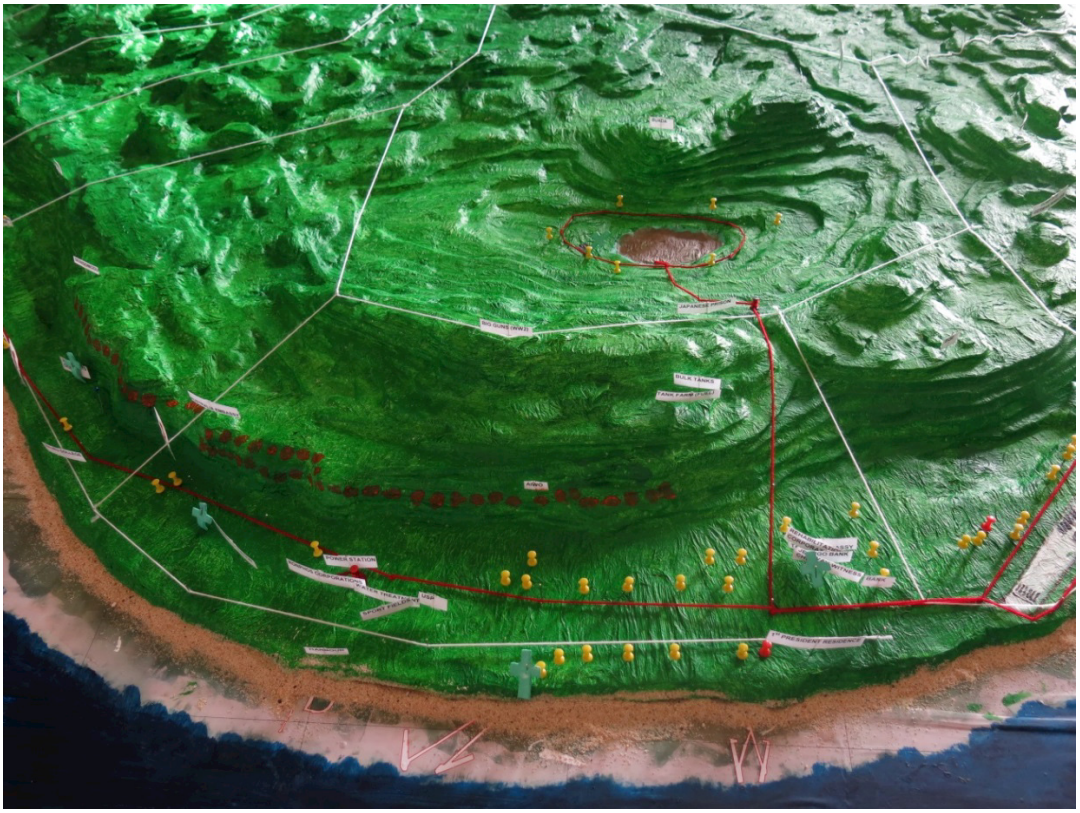


Fig. 26 Nauru's model detail.

Anyhow, at present the Nauruan model is far from being comprehensive in the representation of the island's environmental hazards and current conditions, hence the further P3DM sessions proposed by the President will be absolutely necessary to complete it. The protection and preservation of natural and social capital is always one of the most challenging undertakings facing humankind nowadays, particularly when for so long time the main objective has been the immediate profit without any vision on consequent impacts. Nevertheless, generating the needed awareness among local communities and strengthening concerted management actions it will be hopefully still possible to build a sustainable future for Nauru, this tiny oval shape island that after a century of exploitation and negligence, strongly deserve mindful attention and prompt care.

Part Seven

Valuing Integrating and Enabling

"…we do not make things happen
according to our own design.
We uncover something that is already happening (…)
and create conditions that enable it."
Rachel Naomi Remen

The Transformative Capacities of Mapping

Maps, like the places they represent, are never neutral. They embody certain ways of thinking about the world; are affected by the experience and skills of mappers, they respect certain intents and are shaped by the context of its production (Doodge, Kitchin, & Perkins, 2011). The quality of a map is a matter of perspective rather than design, we should think of a map as a kind of "statement locating facts" (Krygier & Wood, 2011, p.xiii). "People select the facts that make their case; that's what the map is for: to make their own case" (Ibid). Furthermore, maps are not static, rather they are living entities. In this sense, it is explicative the idea of "performativity of maps" by Del Casino & Hanna (2011) who considers maps not as fixed objects but in constant flux of becoming and producing new meanings and engagements. Resulting from the complex interplay between maps and the world they represent spaces and maps are able to co-produce each other through their construction, transformation and use (Ibid). "Conceiving of maps in this way tells that they are never fully formed, but emerge in process and are always mutable" (Doodge at al., 2011, p.6). This moves away from notions of accuracy, design and aesthetic to emphasising the complex contingent inter-action among people maps and the world these represent (Ibid). Moreover, being inherently spatial, maps are also inherently political, a concept which resonates with Harley (1989) consideration of maps as a form of power knowledge. Therefore, bearing in mind a conception of mapping as a context-related tool; strongly dynamic and intrinsically spatial as well as political, capable to socially produce and reproduce places, identities, relations and meanings, the following is the exploration of those that are

here acknowledged as “the capacities of mapping”. The intention is to delineate a sort of path towards understanding what mapping can entail in development practice and what are its main potentials and strengths in supporting ordinary people to augment their agency for triggering and influencing spatial and social change.

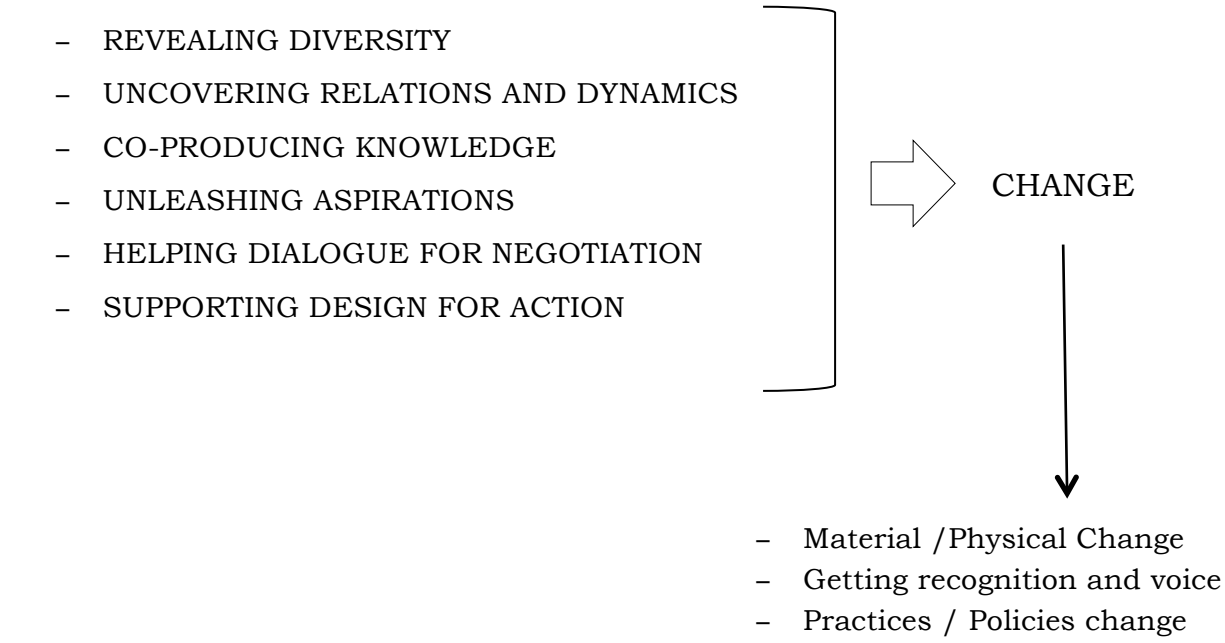


Fig. 27 The transformative capacities of mapping. Author: Barbara Dovarch

The graph above shows the transformative capacities of mapping which have been identified here as: *revealing diversity*; *uncovering relations and dynamics; co-producing new knowledge; unleashing aspirations; helping dialogue for negotiation; supporting design for action.* These capacities express also different ‘moments’ of the map-making process. They can happen simultaneously; they can occur randomly or even in chronological order. In any case, in a virtuous practice, they should all be included. The kind of change at which these capacities aim is here conceived according to three main dimensions. First, the *physical and social improvement,* in disadvantaged or problematic territories, pursued through collective actions’ implementation aimed at responding to practical needs, upgrading settlements and improving living conditions. The second dimension refers to *getting recognition and voice* for those citizens who normally have not a say in decision-making processes

related to space transformation or resource management, and who struggle to be legitimated as development agents. The third dimension regards both the ground level and the institutional level connected by a *change* in terms of *practices and policies*, which would means a more concerted and responsive manner to manage development processes. Within this conceptual framework, mapping becomes a tool of exploring contexts, space-making and, at the same time, a catalyst for generating change.

Revealing diversity

Map-making can be conceived as a process of revealing context's diversity. As Maffi & Woodley (2010) emphasize, the various manifestations of life's diversity, such as biological, cultural and linguistic, are strongly interrelated and hence co-evolve within a complex socio-ecological adaptive system (Ibid, p. XIX). During mapping processes, people break their reality down; they split their own context into its different components. First, by identifying spatial/physical features (both in urban and rural environment), and then analysing the related uses, roles and different significances they give to them. While doing this, they express social values, routines and rituals, norms and conventions, customs and traditions; and also lifestyles, morals, and habits. They uncover consolidated ways of doing, any kind of existing resource or asset, problems and vulnerabilities, historical aspects, intangible heritage, local endemism, people's capabilities. All this entails the bio-cultural diversity (Ibid.) of a particular place, the social character embedded in it. The process is also a path of auto-representation, a way to explore the way people see themselves from "above" and hence from 'outside'. In this respect, an interesting example is the experience of the West Sussex Parish Maps, a project developed by Sue Clifford and the Association Common Ground since the late 80s which successively inspired various similar initiatives within the Italian network Landscape Eco-Museum (Dal Santo, 2010; Grasseni, 2012). The Parish mapping, as a sort of "auto-ethno-cartography" (Grasseni, 2012), has been carried out by local people "bringing to life their landscapes of home" into pictorial representation of their own villages, through the use of maps decorated with pictures, words, drawings (Leslie, 2006 p.VIII). "Some are painted, others woven or embroidered; some made in photographic collages or ceramic tiles or even spectacularly cast in bronze (…). One map has been made as a public garden, its outline formed by the shape of the town, its colours changing with the seasons" (Ibid., p.X). All of them

capture the people's sense of place, "the smallest arena in which life is played out; (…) which has meaning to them. About which they share some knowledge; for which indignance and protectiveness is easily roused; the neighbourhood of which they have the measures; which in some way helps to shape themselves (…)" (Clifford, from Common Ground's handbook as cited in Leslie 2006). Revealing diversity is about exploring the social production of space and related sense of belonging, making visible the rooted socio-physical characteristics of the mapped context as well as its territorial identity.

This increases awareness in all the stakeholders involved, it can generate coalitions, trigger self-organization capacity and consequently self-determination strength. The richness of spatiality's, and related sociality's, representation into maps is unlimited, and map-making is definitely a creative and dynamic process. In this sense, it does not matter if we are referring to a traditional land/village where indigenous/native people live, or if we are talking about urban settlements originated spontaneously by the hand of the poorest. The spirit of a place is embedded in the simple very act of inhabiting a specific space and living daily the related social context.

Fig. 28 Parish Map of Copthorne Village Source: *A sense of Place West Sussex Parish Maps*

Uncovering relations and dynamics

Map-making is also a process of unfolding social complexities and associated relationships. While analysing access to land and resources; administrative or conventional boundaries; questions of ownership and tenure; occupation, encroachments, evictions, and so on, we are deeply exploring contextual asymmetries of power. In addition to this, all the political dynamics that influence the daily shaping of spaces emerge. This is also why map-making can contribute to reveal forms of resistance and/or *dissensus* (Frediani & Boano, 2012). These can range from alternative ways of conceiving, dwelling and acting in space, to inner struggles in contested environments. Relations uncovered can be between community and environment, but also within the community itself, and among the different stakeholders involved. The local institutional arrangements regarding both formal and informal institutions operating in the context are also explored while mapping; especially when dealing with access to resources, ownership and management. Sometimes, in fact, the availability and proximity of services or assets are not valuable indicators of whether people are actually able to use resources. Indeed, access is also influenced by internal socio-cultural codes and conventional behaviours that often refer to gender, age or ethnicity. Designing or planning interventions in a specific context cannot leave internal power relationships and tensions out of consideration as space is mirror of these dynamics. In the case of Nauru, when people had to populate the internal part of the island, they showed reticence. Someone said s/he did not know what was in there, someone else confirmed s/he never goes inland, and another one concluded 'we cannot move around there freely'. Questions suddenly aroused in the outsiders, including Samoan people and myself. Exploring deeper we understood there were specific relations influencing access to land, among Nauruan communities, the local government dealing with the second mining, and the Australian managing the refugees' camps. This is just a simple example to say how the social political structure underpinning the social production of space (which includes use and access to resources) can be crucial; and how mapping can be fundamental in recognizing complexities, uncovering differences and conflicts which needs to be navigated if the aim of the participatory practice embarked is social and structural change. In this sense, we should be ready to look at maps as much for what they represent as for what they don't (Allen et al., 2012). The bird's eye view on territories that mapping allows put people in the position to have a holistic

systemic perspective, which is fundamental to understand cause-effect interlinks and consequently build strategies for improvement. This is also important when building networks with other communities and realities in the city or related territory, or when analysing the scale of possible actions. Intervening at local level, in fact, includes taking into account the implications at other levels and the physical and social synergies that can be created while trying to overcome spatial injustice.

Co-producing new knowledge

Mapping entails a process of co-producing place-based knowledge through the dialectical relation between the spatial and the social. The co-operation between stakeholders - such as communities, government officials, NGOs' operators, professionals - with different perspectives, generate extraordinary exchanges. Everyone has his/her own expertise coming from reality or coming from professional training and everyone is involved in a process of reciprocal learning. Yet, it is not only a matter of learning from the other, it is also a matter of recognizing the own knowledge. There are already skills and competences within the community and, while mapping, people realize how far they know and what the strengths to build up on they have.

The production of data is pivotal in this sense as it gives the chance to people, not only to gather information within the community and learn from each other, but also to access information coming from the government about their official plans or intentions. At the same time, officials get to know closely what people prioritize and value. This is knowledge that otherwise (as it happens most of the times) would stay unknown on both sides. And, this is extremely important as in a way the "mapping moment" subverts the dominant way to communicate and share information within common infrastructures of knowledge production and diffusion. The inter-action between different disciplines, expertise, languages, ways to conceive and sectors, generate a unique opportunity, particularly when scientific knowledge can be integrated with the local one. Hamdi (2011) explains amazingly the power of know-how in the following extract:

> Knowledge is the acquisition of principles, based on experience, which shape our universe of understanding: it demands progressively drawing principles from practice in order to inform action. Know-how is the accumulated skills, practical

> wisdoms and intuition one needs to solve problems, and is the foundation of our ability to improvise in the face of uncertainty and chance which one is bound to encounter in practice. Good practice (unlike best practice) is the application of knowledge or principles modified to fit locally specific circumstances, using the resources of local crafts people, artists, builders who have the know-how to solve practical problems. Good practice is both practical and strategic in its objectives, combining both knowledge and know-how. It is intensely participatory, enabling us to deal with some of the primary causes of problems and issues we face.

Moreover, during the mapping process people of different sexes and ages work together, allowing an extremely rich inter-gender and inter-generational give-and-take. In this way, the custodians of the past transmit precious know-how to young generation. The elders get the picture of how their own place of living changed throughout time both physically and in the mind of the youngest. Men and women have the chance to be in a condition of equal right to voice (at least in principle). This latter is a quite sensitive issue which will be discussed later in this chapter. In sum, map-making should not be considered as a simple representation of the existing, rather it should be conceived as the exploration and co-creation of new understandings, ideas and therefore new knowledge. Maps should amaze, surprise, elicit rather than confirm. Even their chaotic imperfection can be an opportunity, an occasion to think otherwise, to look at the reality from a more comprehensive point of view that allow a recalibration and new balance among different perspectives.

Unleashing aspirations

The Indian-American anthropologist Arjun Appadurai (2004) conceives the "capacity to aspire" a cultural capacity, a future-oriented logic of development though which the "poor can find the resources to contest and alter the condition of their own poverty" (p.59). Appadurai asserts that "efforts should be made to encourage exercises (…) which increase the ability of people to navigate the 'cultural map' in which aspirations are located and to cultivate an explicit understanding of the links between specific wants and goals and more inclusive scenarios, contexts and norms …" (Ibid., p.83). He adds "it is through the exercise of voice that the sinews of aspiration are built and strengthen, and conversely, it is through exercising the capacity to aspire that the exercise of voice by the poor will be extended" (Ibid., p.83). Map-making can have a significant role in eliciting the

capacity to aspire. In the case of Vietnam, to make an example, at the beginning of the six months work, several quite popular participatory methods (focus groups, river of life etc.) have been tried to involve communities in an exercise in which they were requested to analyse the past and the present, and to throw themselves in the future. The goal was to capture the vision of local people on the development of their own place of living. All the attempts failed. Differently, through mapping the drainage system, people got gradually self-confidence. They started thinking about the possibility to enjoy two rice harvests instead of one, improving their livelihoods and living conditions in general. They consider their map-making work as a way to draw the attention of the government on their priorities and in so doing, they created a space not only to imagine their future, but also to think about how this future should actually be, regarding the drainage system, but also regarding possible alternative developments and interventions within the Hung Hoa area.

Frediani and Boano (2012) inspired by the words of the American activist known as bell hooks argue that "bonds of solidarity are not formed by identities or histories of oppression in common but by hope for what is yet to come" (p.216). Aspiring to a better life is a right of everyone. However, when living conditions are very tough, many people consider themselves in a position of not being able to dream. "Spatial imaginaries are mental maps representing a space to which people relate and with which they identify. They collectively shared internal worlds of thoughts and beliefs that structure everyday life" (Boudreau, 2007, p.2596). They represent held values, fantasies, ideals and desires in the long term (Ibid.), and if unleashed, they can trigger coalitions and increase the capacity of people of thinking collectively, which is a basic condition for many actions such as sensitizing governments, claiming rights or acquiring land. Spatial imaginaries are mechanism to encourage utopian thinking, which is defined by John Friedmann as the "capacity to imagine a future that departs significantly from what we know to be a general condition in the present. It is a way of breaking through the barriers of convention into a sphere of the imagination where many things beyond our everyday experience become feasible" (2000, p.462).

Within the process of map-making when people, particularly the poor, realize their know-how, their resources, abilities and potentials. When they get more information and data; when they deepen their understanding; when they have the opportunity to be heard and are put in a position of equality with other stakeholders; when they distinguish the possibility to influence decision-making

processes; people start believing in their strengths and consequently they liberate their own deep aspirations. Drawing on Conradie and Robeyns, voicing of aspirations in small-scale development practices can unlock the agency that is needed in order for the desired transformation to happen (2013).

Helping dialogue for negotiation

Wood (2010) reckons that maps have a discourse function and that this function affects behaviour by binding people to each other through the description and analysis of territory they mutually inhabit. The role of maps as communication means for dialogue among stakeholders is significant. Maps are instruments where both traditional knowledge and scientific knowledge can be represented offering a base of discussion. The possibility for communities to visualize their territory, in terms of their ways to represent it, their analysis and proposals related to physical transformation, as well as the inner cultural and social features showed, gives them the chance to have a powerful tool when meeting local authorities.

Maps are point of reference in the discussion and entail a reliable support.

The awareness acquired by people during the mapping process together with the maps themselves contributes to enhance their capacity to negotiate and dialectally argument their positions and opinions. As Leach et al. (1999) point out it would be naïve to think that negotiation processes occur in a fair play environment. "The very idea of negotiation conjures up an image of parties equally able to voice their positions and argue for them, which is very far from reality in most of the situations (...). Just as power relations pervade the institutional dynamics of everyday resource use, so they would pervade any negotiation process" (Ibid., p.241). This is why empowerment should deal with communication means which people can use to strengthen their bargaining power and enhance their claims-making capacity in front of the most powerful actors. The idea is contribute to opening up new space for dialogue among stakeholders which can be certainly conflictual, yet that with proper tools of interaction, has the chance to be also constructive. If participatory processes are political processes and space is inherently political, and maps which represent spaces are certainly political, we strongly need tools for transparent communication and clear understanding.

Supporting design for action

This last capacity is the natural consequence of all the previous capacities described above. The result is that people map-making can be considered an essential means for concerted planning and community-led natural resources management. The reasons why have been explained so far, showing how this approach can contribute to visualize the heterogeneity of local reality; multiple ways of living; social values and injustices manifested in space; different stakeholders' positions and perspectives and so on, thereby capturing and translating voices in a realm of representation.

Spatiality's conception moved from physical objects and forms towards the variety of territorial, social and political processes and their interrelationships embedded in space (Corner, 1999). "Mapping is key as it entails searching, finding and unfolding complex and latent forces in the existing milieu" and at the same time "discloses, stages and even adds potential for later acts and events to unfold" (Ibid., p.227). While plans decided from on high lead to an end, map-making provides a lively tool; a "generative means, a suggestive vehicle that 'points' but does not overly determine" (Ibid., p.227). In this sense, mapping is not only a way to investigate and capture place-making practice but is itself a means to produce space and social relationships (Allen et al., 2012).

The process of people map-making definitely demonstrated worldwide its value, power and efficacy. However, regarding the capacity to support design for actions, probably some step forward should be made. As analysed in previous chapters many have been the attempts to integrate people mapping with geographic information technologies. The idea is to make the 'products' of mapping processes, specifically the maps, as much effective as the process which produced them. The intent is to render hand-drawn maps more authoritative, intelligible, and most of all more usable by experts and officials. This idea is based on the evidence that local inhabitants possess expert knowledge of their own life environments which can be expressed in a geographical framework, easily understandable and universally recognized.

People Map/Model-Making + GIS (PM+GIS)

Participatory mapping conceptually includes both people mapping and PGIS.
The majority of the Participatory GIS approaches analysed in Part 4 started with, and focus on, the GIS technology trying to render this instrument, in different ways, participatory. As already described, in fact, many of these methods give much attention to 'participation' in the data collections through methods like interviews, questionnaires etc. (which is certainly important), to subsequently inserting this information into GIS software through experts' desk work without any people involvement. Also, some of the methods analysed do not include a "community check" after the digitization phase. Then, those who have tried to bring the GIS technology directly to the community as a first step of the process, (without any previous people mapping), and tested the community reaction and interaction with these tools, have realized the 'strong' and not always "friendly" impact of this approach. In Part 4 we have also explored the viral success of VGI through the Web Mapping interactive tools (which probably will keep growing exponentially now on) and their widely recognized efficacy in certain circumstances. However, the main concern and approach in this research work is different. In fact, instead of starting from technologies and trying to make them more 'social', I started from a social process and approached technologies to support it. The focus fell on the people-driven map/model making since, on the base of this work there is the belief that face-to-face interaction, as first step, is fundamental in participatory mapping practices. Consequently, in here, GIS is considered equally essential in the process of mapping, however it intentionally comes in a second stage. It is conceived as a potential added value, as a means for supporting the people's mapping. For capitalizing data and information; for capturing and recording everything is produced during the process; for improving and making more authoritative, communicable, functional and in particular, re-usable map-making outputs and results. People map-making and GIS include two different languages and modes of operation, however they can work well together, benefitting from each other and mutually enriching. On the one hand, this integration gets professionals and government officials closer and more aware of the potentiality of people involvement in design, planning and resources management. On the other hand, it nurtures the co-production of knowledge, through collective work and efficient 'products' of

mapping 'processes', which give value to people's contribution in design while cultivating their socio-spatial agency.

People Map/Model-Making + GIS or more simply People Mapping + GIS (PM+GIS) is a methodology personally ideated during this three years research path which seeks for the effective integration of different methods already existing, within a wide framework of knowledge co-production.

It obviously still needs to be developed and applied to be tested; anyhow the following is an attempt, based on the literature review and on the personal experiences in different countries, to outline the base principles of this practical fully concerted process.

Fig. 29 Source: *IIED,Participatory Learning and Action n°54 Mapping for change*

2D or 3D mapping

For the face-to-face mapping process, the use of 2D maps or 3D models is equally valuable and both the methods widely demonstrated their feasibility. The choice depends on the purpose of the exercise, on the specific context in which mapping occurs and on the financial resources available.

Some scholars and also some participants in P3DM reckon that models are more realistic than maps. People can orient themselves more easily and the possibility to materially visualize land elevations augments the chance to deeply understand implications and risks particularly when analysing environmental hazards. However, in some context, P3DM could be too expensive, and not only due to the

costs of the model's manufacturing itself, but also for the procurement of materials for construction or even for local cultural implications. In Samoa, for example, P3DM was possible because of the consistent amount of money provided by UNDP to MNRE. Materials were not available in the islands and had to be imported from abroad. Community meetings, particularly when the government summons citizens, have a particular cultural code in Samoa, so that who invites have to pay a reimbursement to participants for travel expenses to reach the venue (if not located in people's village), and providing three abundant meals par each day of work. All these are costs to be considered. It is understandable that when other villages, different from those called by MNRE, asked for involvement in P3DM processes, the government had to address people towards other funding options such as the UNDP Small Grants that is not actually so 'small' money (the grants are of up to $50,000). Moreover, Samoa is a minor state and UNDP works quite close to communities; this is not usual in most of the developing countries worldwide.

In the case of ACCA in Asia, in which people use 2D mapping as a tool of involvement, ACHR considers "insufficiency" one of the core principles of the program. They strongly believe, indeed, in the 'social value' and "catalyst capacity" of money. They provide people with grants (which can become loans and then revolving funds by community's choice) of $3,000 for infrastructure upgrading projects and $40,000 for housing projects, which obviously, in most of the situations, are not sufficient to reach everyone or to resolve all the problems. Nevertheless, AHCR reckons that with small money available, people have to think harder: they have to save collectively, to summon all their own resourcefulness to negotiate in order to leverage other funds, to seek out partners and to forge collaborations (ACHR, 2010). Much work in fact is made for increasing people self-organization, networking with other communities and partnership with the government.

Anyhow, even if making models seems more expensive than making maps, we need to consider that P3DM costs can be radically reduced in contexts in which materials for construction are easily available; or where communities offer spaces within their villages for mapping sessions; as well as they collaborate in the organization of workshops as it happens very often.

In sum, 2D or 3D methods are both valuable and effective ways to enable people mapping, the choice is context-specific.

Locals' training on GIS

The digitization of data after map-making should be one of the central objectives of the mapping practice. Even if giving space and great importance to the *vis-à-vis* process, it is fundamental to keep in mind the prospect of digitizing information in a second stage. This has various implications. First, the preparatory phase before map or model-making is very important (in the case of Nauru we saw how a lack of attention in this phase influenced the process especially in terms of participant's number). Within this phase, it is fundamental: a first analysis of the social dynamics in the context in which the process of mapping will occur; the mobilization and sensitization of local groups and stakeholders; as well as the organization of materials, base maps and workshops' logistic.

Second, the training of the locals as facilitators is also key in the process. These can be government officials, NGOs operators or even better, CBOs members. In P3DM practice, training is one of the main goals of CTA. Nevertheless, the training is mainly related to the process of model-construction and related community process which is considered the essential component of the practice. This is certainly proper, although it would be fruitful to consider a training phase also about the use of GIS for model-data digitization. In order to overcome the access barrier to GIS software and expertise, a practicable option would be involving students of universities possibly those who are studying Human Geography, Urban/Rural Planning, Environmental Studies or related.

In the case of Samoa, for example, MNRE involved a GIS expert in the process who was also part of the government facilitators' team from the project's start, and who participated in all the P3DM phases. This was extremely important as he could witness the co-production of data and was able to interpret legends and maps respecting the people's meanings and process. However, as it happens to most of the persons who acquire professional skills, particularly in developing countries, he had the chance to move abroad for working in GIS field. Only 4 models up to the 19 manufactured have been digitized by this technician. After his departure the data stayed stored in his computer but, at the time of my fieldwork, no one in MNRE was able to digitize other models, or even to simply open the GIS files and elaborate them. During my time in Samoa I helped to rationalize the 4 digitization works, yet I realized with sorrow the amount of community data that at the moment are not capitalized. Furthermore, the fact that, even with understandable reasons, most of the models did not stay in the villages but are stored in government buildings (what

is more they are accessible but the legends are not with the models!), in a way makes the situation worst. Differently, within universities it would be possible to create action learning platforms; involving lecturer, researchers and students for steadily supporting communities. This could have a positive effect both on students who gain practical experience within their academic training (using technologies and engaging with reality), and on local people who can have a constant point of reference in terms of digitization and updating of information o GIS. It would be even better if some of the university students were part of the community involved in the mapping process or if university students could train on GIS some young community members.

Working with digitization in sight

It is important to foresee the digital post-production since the beginning. Scaled maps are useful as a base in people mapping processes, as these have formal cartographic protocols and allow the digitization work afterwards.

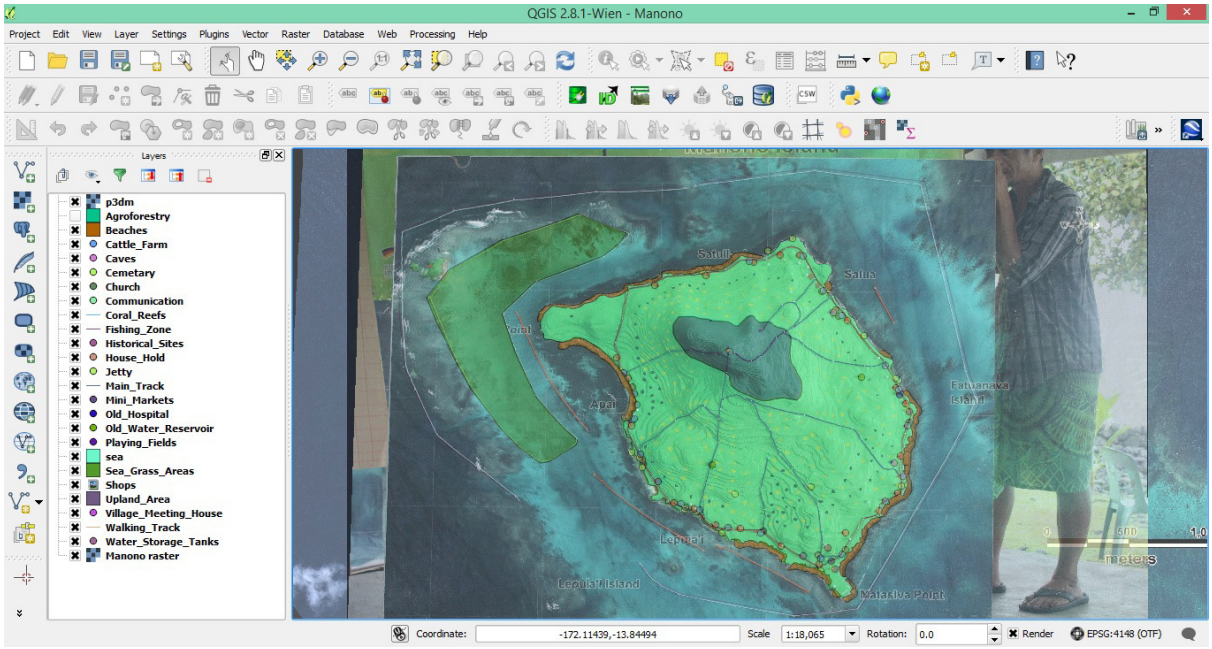


Fig. 30 Geo-referencing Manono Island model's picture, Western Samoa

Also, it is proper to orient the map North-South with a compass and keep focus on consistency in gathering information and data as well as maintaining a well-articulated coding-system during the entire mapping process. This could be also supported with other participatory methods such as transect walks with locals in

case provided with handle GPS and/or satellite images. Also, individual and collective interviews, survey and community-led enumerations particularly in informal settlements (Abbott, 2003); as well as collective measurement of all physical features at issue, can efficiently complement and enrich the map/model-making work and the digital database creation on GIS. Another important aspect is that governments, NGOs or donors who decide to put money in community mapping processes, should reserve a proper budget to digitization, a work that, to my experience, in this moment is not always enough valued by investors. The same should be kept in mind in the case money is managed directly by communities, even when grant's or loan's amounts are not be able to cover the digital elaborations expanses.

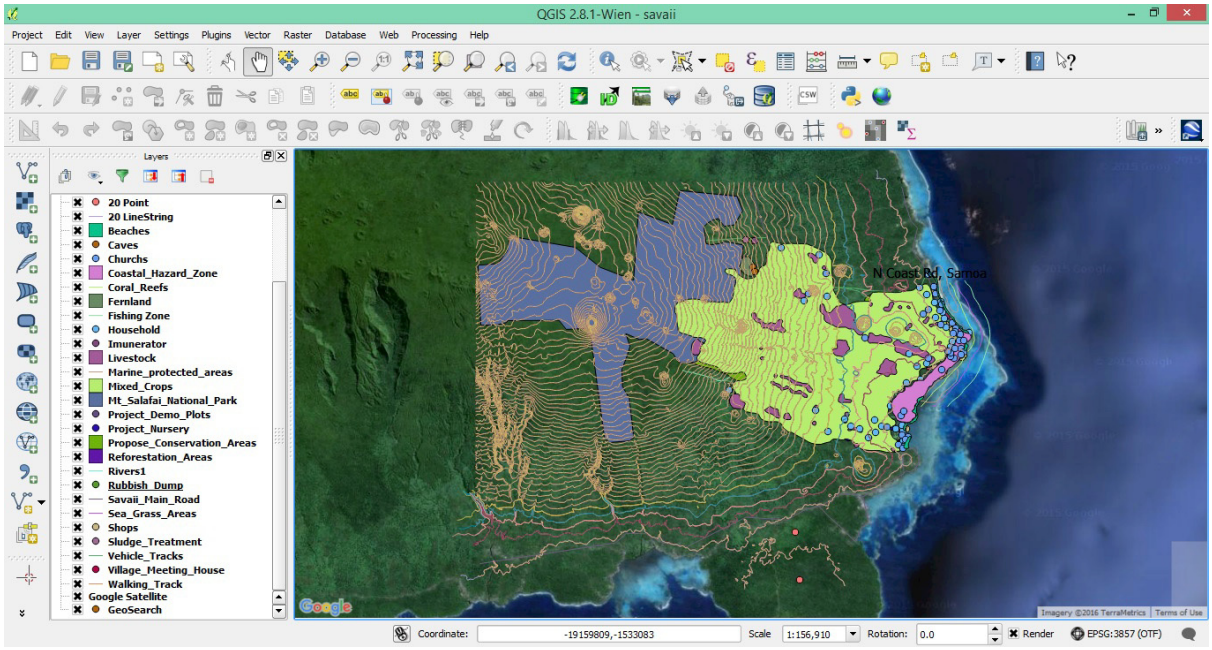


Fig. 31 Digitization of Mt.Salafai area's model made by people in Savaii, Western Samoa

Making GIS a narrative tool

One of the main concerns of practitioners is related to the possible loss of socio-cultural richness and diversity arose in people mapping, when converting data in digital form. It is true that current GIS are predominantly spatially deterministic, yet it also true that there are infinite possibilities in the database creation and that we can easily combine other forms of representation and media as McCall (2006) suggests (see part 4). It is indeed possible to add narratives of places on GIS by linking texts, videos or photographs as well as generating new social data through

the crossing and layering of information. In other words, if approached ingeniously, GIS can become a very creative tool, which has enormous potential to get closer to the ways communities know or conceive their places of living, while at the same time triggering alternative ways of knowing and understating reality.

A big challenge is still render GIS more participatory, as so far the digitization work stays in the hand of experts. A fundamental role is played by the "checking info" phase that means coming back to the community after the digitization process to make them aware of the work done and particularly for them to check the correctness of data. Without any doubt people will find easier to understand a GIS map which originates from their own work and consequently will be able to interact with the digital tool.

In addition, GIS allows the possibility to visualize maps in 3D that can be useful for people to check information on-screen, particularly when the people mapping process was based on model's production such as in P3DM.

As mentioned before, if university students are involved in the process from the beginning, they can bring laptops with GIS in the field during the map/model-making sessions, so that people can gain confidence with the instrument. It would also possible to organize 'digitization workshops' after the people mapping process, in which students and community members divided in groups and in front of computers can discuss while digitizing together information and data.

Moreover, after maps or model's digitization, it is possible to print out the 'new maps' produced and to use them for further participatory planning as they embody a perfect synthesis of the necessary knowledge to gain, and on which to base, any kind of decision-making and intervention. This could be certainly useful particularly for P3DM processes in which most of the times models are of big sizes and cannot be moved easily. Having the 'digitization maps' printed out means that people can bring them when meeting with government or other stakeholders, to get a tangible and visual reference in discussions and negotiations.

Further possible developments

When collectively planning on a vast area, it might be necessary to focus on single portions of territory for detailed designs or for involving communities in discussions about issues specifically located. If model-making occurred for the big area, instead of manufacturing other maps or models for the smaller land parts at issue, it would be possible to think about 3D printing. This refers to processing information in

order to materially produce a three-dimensional object using digital data from a 3D model. It is a quite complex process which requests expensive technical instruments so it would be applicable only in certain conditions and contexts. However, it could allow speeding up and making participation more immediate and continuous in planning or resource management, even if, to my view, this could happen only with communities previously involved in all the other participatory phases, such as first in people map/model-making and then in GIS digitization.

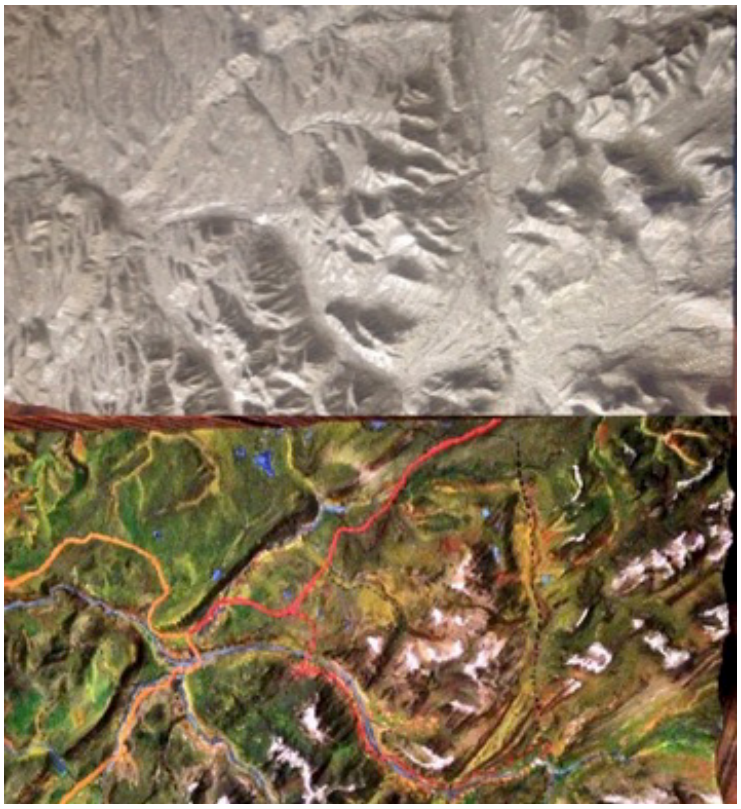


Fig. 32 Example of model printed with 3D printer and then populated/coloured with physical features. Source: *http://www.fabbaloo.com/blog/2016/3/30/another-3d-printing-use-case-land-models*

Enabling People Mapping Practice

Based on the literature and on my own practical experiences along with those of other people I met during my fieldworks worldwide, the following is a reflection about the role of development practitioner in participatory practice and particular within people mapping process.

Being prudent

Drawing on Aristotle, Slim (1996) talks about 'practical wisdom' in relation to relief workers, defining it as a 'situational wisdom' derived from experience, which is based on the virtue of prudence. According to Slim (who built up on Aristotle's thought), it is possible to identify three main characteristics of practical wisdom, such as: the aptitude to weigh up and analyse circumstances before deliberating; the capacity to relate immediately and intimately with a situation (empathy); the ability to understand justice and equity in a given context. In the same way, Hamdi (2014) affirms that practitioners in order to become good enablers should become prudent providers. They should also be able to step outside their own intellectual and disciplines' domains, their cultural and social norms, their levels of organization in the hierarchy of power. This means that they should not be defensive of their outside worlds trying to fit their own beliefs and value in the inside worlds in which they intervene; rather they should be conscious that in participatory work our ignorance is made transparent and our intentions should always be negotiable (Ibid).

As outsiders we will never be able to wholly understand everything; or to foresee all the possible consequences of our own interventions; or to totally avoid mistakes. We need to accept this. In a way, our ignorance can be also liberating, it can leave space to think differently in search of alternatives (Hamdi, 2004). Anyhow, we have great responsibilities towards the context we operate within, and our task is to make our actions meaningful locally, always guided by prudency. Lavigne Delville et al. (eds., 2000) underline the need to developing political sensitivity and social skills, while being modest and pragmatic in ambitious, being precise and rigorous in objectives.

Fig. 33 Me and Nad hanging up the engineer-made map to be checked by community members, Bagong Nayong, Valenzuela, Metro Manila, Philippines.

Being an actor in the process

We have also to be aware of being part of a political process and of being actors in this process. Indeed, wittingly or not, we shape and influence our circumstances and we might be embroiled in local power relationships. This is why our presence in the field is never unbiased. Our role is rightly questioned by local communities, especially at the beginning and mainly about where we as professionals and our 'mission' in the field have origin and motivations. It is often a matter of finding the right balance between being open, actively listening and respecting people and contexts, while at the same time, getting locals' attention, interest and being able to sensitize and mobilize them. To my experience, I have been in situations in which it was proper a very humble approach to be able to interact with people, particularly when they had had previously bad experiences with too invasive and self-referential researchers, as in the case of Philippines among others. Inversely, I have been also in other situations in which the overreliance of locals on foreigners' expertise, particularly of westerns', was so rooted that I had to give them an idea of my

professional (in particular technical) skills to obtain the needed consideration and respect from locals. This was for example the case of Samoa. Building trust and reliable relationships with local communities is crucial in participatory processes. As Verplanke (2016) argues: 'socially sensitive information is present beneath the surface and can only be elicited, if appropriate, through the slow build-up of mutual trust' (p.4). Anyhow, the way we do it, it is strongly related to specific contexts and social dynamics.

Being a 'moment' along the way

In this realm of prudent providers, we can be a 'bridge' among stakeholders, enabling platforms of learning, dialogue and action. The practitioners' 'dance' of stepping in and stepping back is essential and should be a continuous way of adaptation along the process. A sort of trade-offs between helping, supporting, guiding (without leading) and seizing those moments in which it is necessary to leave people being in the front, doers and makers of choices or decisions, while letting the process flow spontaneously. Sometimes the presence of practitioners is an opportunity in the context and we should be able to build, together with people, up on these energies.

For example, in Samoa a participatory evaluation on P3DM experience was not planned when I arrived there. My presence was considered a good occasion to organize it, particularly thank to the open-mindedness of the MNRE official who was my main reference during the fieldwork. My position was a bit controversial in front of people as, in their view, not only I was an outsider coming at the end of years of P3DM practice; not only I was a presented as a researcher; but I was also working with the government.

Therefore, I pushed for organizing the participatory evaluation; I shared with officials a list of questions which I considered proper for analysing P3DM, its positive effects, possible limitations and potential improvements, and then I stepped back. I let them leading the meetings in the Samoan language as this was preferred by the *matai* and representatives invited. At the end of the meetings, I still had the chance to have very interesting informal conversations with people (as most of them can speak English). It was useful to understand their positions and opinions and they asked me many questions about the potentials of model digitization, especially the women.

I also met with officials the day after to debrief and have their feedback. This is to say that even if I could not be always an active part of community meetings as I could not understand most of the discussions, those meetings and the relative dialogue between community and government about P3DM activities, in all probability would have not been organized if I was not there. In a way my presence generated a brief but important moment along the process. As Hamdi (2004) reminds us, we are not starting development we are part of the development continuum, so "we join the process somewhere along the way and try to help it along with new ideas, new wisdom, new technologies and new skills" (p.130).

Fig. 34 Community discussion in Hoa Lam, Hung Hoa, Vinh, Vietnam.

Being aware of tools used and forces in play

As already explored in chapter 4 it is essential to be aware and make people aware of the tools they are using in particular in the case of maps/models-making which are related with gathering of information and data and which can be made public. This aspect of the mapping practice is very sensitive and requests great attention. Also, it is important exploring the pre-condition of the context in which we work,

and considering the possible effects and potentials that a people-led process can have if dialectically located within a definite institutional framework.

In addition, fundamental is a focus on stakeholder's analysis that could give a picture of the power forces in play. This is not only related to government, communities and other actors, but also within the community. Very often, in fact, internal dynamics influence the 'participation' itself. For example, sometimes participatory workshops which are meant to be informal and open, for internal reasons we cannot control, suddenly acquire a different nature and become very formal (Neef, 2003). In these cases it might happen that community leaders monopolise meetings and discussions; that only the organized social groups participate excluding those which are not represented; that women are pushed back and young people are not listened.

Fig. 35 Discussing and organizing the mapping process in Bagong Nayong, Valenzuela, Metro Manila, Philippines

On the other hand, participatory practices worldwide (including mapping activities) have demonstrated to be able to transform the business-as-usual patterns of domination in community meetings, proving valuable in giving people who are often

ignored and excluded the chance to have their say (Cornwall, 2004). This is why navigating these dynamics is crucial. Sometimes, it can be useful to identify the 'natural leaders' within the community; not those elected, but people with a natural charisma and particularly assertive approach in facing people, who can help practitioners to exploring community's internal relationships. Moving inside the power structure of a specific context we do not know as outsider, it is always a big challenge, anyhow we should do our best to be attentive to these dynamics and we should be tactical dealing with them. The challenge is making differences relevant, while legitimating people's priorities and enabling conflicting perspectives and positions being all voiced and heard.

Being flexible while triggering creativity and capacity

Creativity is a must in participatory development practices, coupled with flexibility. Practitioners should have these two properties when working on the ground. Being flexible means being able to organize and plan activities, yet as participatory processes are intrinsically unpredictable, being also able to improvise, to change plans and welcome the natural course of events. Flexibility means also to adapt to the time and availability of people. For example, farmers in rural areas generally are available to participate in workshops only in certain moments of the day (normally the hotter ones as in the case of Vietnam) or even only in certain periods of the year, due to the seasonality of activities and rotation of crops. Moreover, being flexible means also being open-minded. Working with people can be a liberating position for professionals, an occasion to think outside the boxes, outside their disciplines' comfort zone; meanwhile identifying capacities, building up on existing resources and people's skills, being able to trigger creativity and imagination. A real team is that group of people in which every individual recognizes the role of the other, his/her skills and his/her complementarity. If valued appropriately the encounter between professionals and people can have a radical effect, a way to contest the common procedures of doing, of planning territories and managing resources, as well as proposing alternative ways of thinking and understanding reality.

Being providers of options rather than solutions

Generally, practitioners should not provide final solutions, rather they should explore with people a range of possible feasible options (Frediani, 2016). This means reshaping the boundaries of the possible (Hayward, 1998), evaluating the transformative potentials of interventions and actions. Yona Friedman (1975) suggested building a repertoire of possibilities, enabling individuals to intervene with their own set of ideas and aspirations to determine the material conditions for their own place of living, while articulating their own set of spatial values (Friedman as cited in Boano & Frediani 2012).

Fig. 36 Children particularly interested in the mapping activities of adults. Hung Hoa, Vinh Vietnam

This means enabling people to "stamp their own identity on places" (Hamdi, 2011) exploring previously un-heard ways of doing, alternative modes of thinking and acting, collectively assessing solutions which are flexible, adaptable and open-ended. The idea is to make people able to be makers and shapers (Gaventa, 2004) both in planning/design and resources management. This way of weaving space, transforming and managing, by basing actions and interventions on knowledge collectively co-produced, should turn into praxis.

The work of development practitioners towards this objective is long and challenging. Anyhow, every time we operate on the ground together with local people we should be able to leave the context at the end of our work with the certainty that the process we initiated, or the on-going process we joined, can effectively continue without us. In other simple words, we should be so useful to become useless.

Conclusions and Prospects

The two practices People Mapping and Participatory GIS are considered as forms of counter-mapping. In here 'counter-' should be understood according to its both meanings: 'counter' as 'being against' and 'counter' as "being complementary". People map-making is for design and planning a counter-narrative in the production and re-production of space. Through making visible grounded perspectives, people resist, contest and therefore 'counter' the consolidate praxis of space transformation. At the same time, through mapping people offer new knowledge, new understanding, new imaginaries that aim at being a 'counterpart' of such a praxis. In the same way, PGIS can be defined a 'counter-melody' played by those geo-spatial technicians who aim at being more 'sensible' and understand mapping as a social process. However, the best conditions which can allow local communities to benefit from technologies in a 'sensible' manner probably still need to be found. Indeed, the possible loss and 'hardening' of qualitative information, particularly in terms of socio-cultural features, when converting data into digital forms, should be examined. The collective and concerted nature of mapping practices and process should be preserved, and not only in people map-making process itself, but also when the digitization phase occurs. Digital inequalities and constraints in accessing technologies should be addressed and the possibility for the locals to be trained on using technological tools should be considered.

This final part of this work does not want to have a 'conclusive' nature, on the opposite it aims at being open to future progresses. Moreover, in line with the practical attitude adopted so far, the intent is to outline the main ideas which underpin a possible project to be developed. The base principle is to create the adequate infrastructure which can potentially enable the best implementation of PM+GIS practice personally ideated and described in Part 7. To my view, indeed, the process of mapping as people practice has widely demonstrated its 'transformative capacities' (explored in Part 7); its efficacy in supporting planning and resource management (the different case studies analysed here are an example, together with the other numerous cases described in scientific as well as grey literature); along with its ductility (flexibility, adaptability, possibility to be contextualized as described throughout this work). Obviously, participatory methodologies continuously need to be experimented, deeply explored and

improved and this also applies to people mapping. However, it can be argued that people mapping has proved great value in the social production and transformation of space. Furthermore, as described in this thesis, GIS technology, if managed with proper sensibility and ethical consciousness, can be brought closer to people in creative modalities. This is to say that many of the constraints that influence the implementation of mapping practice are not related to the people map or model making process itself, but to the framework that enable or disable its operation. Moreover, when integrated with the GIS technology these constraints are exacerbated. The main difficulties encountered seem generally related to: funds/costs and time; political will; administrative mechanisms; technical competences; sustainability of mapping systems; continuity in supporting communities. More precisely, when including technologies the process costs increase; local government or NGOs rely mainly on external donors or intergovernmental organizations for funding these kinds of processes, and on external consulting for training officials or NGOs operators on community process facilitation and GIS. Also, in developing contexts, often officials or NGOs operators who gain technical skills move for more remunerated working positions locally or abroad. Consequently, it is hard to sustain the mapping system, and the communities involved, in the long term (updating of digitized maps, use of derived maps for planning with people new interventions, replication of mapping practice in other areas and so on). This limits the possibility for mapping to become a mainstream practice. Furthermore a challenge to realizing the potential that people mapping and in particular the integration with GIS offers, is the widespread lack of effective administrative mechanisms and structures which are important to execute and monitor decisions reached through mapping processes. This means taking into account the access to topographic maps to be used as a base; the presence of disabling regulatory frameworks that constraint the practice in many ways; and, not less important, the political will within local government. This latter considered in terms of understanding the potentials of this kind of processes, enabling their implementation through opening platform of dialogue with locals, allowing access to official mapping sources, and re-thinking about procedures. Given this, what would happen if instead of trying to change the 'system of money' or the 'system of governance', with it might be too ambitious, we start operating on the 'system of knowledge'? The idea would be the creation of a bridge between governments, NGOs and people which is not based on money and can contribute to good

governance. This bridge can be represented by local universities. These could be networked to partner with other universities, in case western universities, in order to organize courses on mapping for local students within related disciplines' departments, to train, in collaboration with lecturers, local students on people map/model making processes' facilitation and GIS use.

It is always proper that facilitators can understand participants' language; certainly they are closer to locals' vision than foreigners; they are young, full of energies, they are university students so they must have curiosity and willingness. Also, they need practical experience in the field for enriching and grounding their learning process. Through universities' funded educational programs, trainers can be external lectures and practitioners who go to spend certain period of time at local universities of countries in need, as well as in the field, in order to train students while they help initiating the community involvement for the mapping process. Then, they can offer support at a distance and come back only when and if further training or support is necessary. Local lecturers and their students would become the main point of reference for communities as they can facilitate the process; digitize maps, update and manage data in constant relation and in the long-term.

Moreover universities can contribute to sensitize local governments on methodologies of involvement and their potentials; ask for their application and provide (with the communities' consent) digitized and updated people process-derived maps to be used as a base for organizing participatory planning workshops any time a new intervention in the mapped area is needed, or a decision about such area has to be made. NGOs can also benefit from the 'university bridge' to get rationalized data and information when working and supporting local communities. Even intergovernmental organization could find very useful the production of knowledge based on local know-how to be considered for the implementation of their programs. Within this system, costs are not completely eliminated of course, however they are significantly reduced. And they do not need to be faced through *ad-hoc* funds, but they can be easily included within the already existent universities funding systems for educational programs. Participatory processes in general and PM+GIS in particular needs quite a long time to be properly carried out, so it cannot rely on time-limited funds, which, once over, undermine the work done, including the optimization of data gathered. Rather, PM+GIS would need to count on a systematic, continuous, efficient supporting organization operating within a platform of action learning alliances.

To clarify, the idea of 'alliance' here is conceived not only among universities, governments and NGOs, but also it includes grassroots organizations. This means that everyone should be learner, teacher and agent within the platform. In this respect, it is interesting the idea of 'open university' carried out by ACHR within ACCA program. "Teams of community leaders, and their partner NGOs who are actively implementing their own ACCA projects, assess the work of their peers in other nations through visits to ACCA projects and discussions with the people who are implementing them" (Carcellar & Kerr, 2012, p.513). Networked communities, particularly within the same city or the same country, can share knowledge and expertise among them about mapping processes, maps and models manufacturing as well as digitization. There are some cases in which young members of communities involved in mapping processes are trained as facilitators and GIS expert. For example, this is happening after a P3DM project in Suriname promoted by CTA who is training a young girl from the community (informal conversation with Giacomo Rambaldi). If local universities are involved, some community member could attend the courses together with the students and this could be of great value for the entire mapping process.

In a system of 'reciprocity' knowledge is uncovered, shared and co-produced by all actors equally involved. The inter-action between different agents with different expertise contributes in the creation of a unique comprehension of reality which would never be reached without such collective energy. Mapping is a powerful practice in this sense. When places and people who live in, are abstracted by outsiders' views and sometimes misinterpreted and misrecognized, as the outsiders ignore the reality happening in such places. And particularly, when outsiders are those taking decisions on space transformation whereas locals cannot have a say, mapping practice acquires a fundamental role in enhancing people capacity to bring about change. In this sense, those usually excluded from planning processes and resource management, do not aim at being just included in the established modalities, rather they aim at having the opportunity for questioning such modalities; reconfigure methods and procedures; proposing alternative narratives and more contextualized actions; setting important precedents; as well as influencing decision-making. This does not mean that mapping is always the solution or the only way possible and neither that it is always the case to map. Nonetheless, if considered adequate for specific contexts and moments, map/model-making can be an effective means within people strategy

to pursue more just physical and social change. Certainly, the process of mapping in general and the integration of different methodologies here explored, particularly when technologies encounter hands-on and face-to-face practices, still requires further ontological, epistemological, methodological and probably ethical questions. And so it should be, as mapping practice is a dynamic force in continuous and unstoppable evolution. Therefore, this work does not pretend to be exhaustive or cover every aspect of mapping. Yet, it is the result of a 'reflective learning in action', and a 'grounded research experience'. In this sense, hopefully it could saw a seed of progress in people map-making realm; a small contribution within collective processes aimed at voicing dialectical space production and re-production, through enabling citizens to exercise their rights and agency, while transforming power relations, towards more concerted development approaches and practices.

Appendix

Participatory Mapping Methods Compared

Sketch mapping	Community members draw maps from memory on blank paper. Features are depicted with natural materials or more frequently with coloured marker pens or chalks. People cannot rely on scale so the location and the size of features are related to the attachment they have to them and are influenced by their perception.
Potentials	Good to frame important issues and explore people perception of spaces and places. Legend is crucial for interpreting depicted symbols. It could be useful in an initial phase of mapping.
Limits	The lack of a consistent scale and geo-referencing of data leaves room for subjective interpretation. This makes these maps no useful when locational accuracy or land measurement is fundamental for the purpose of the mapping. Less credibility and authoritativeness compared to other kind of maps in front of government officials.
Scale mapping	This is a more sophisticated method aimed at generating geo-referenced data to facilitate discussions and allow community members to develop maps. The method is based on effectively selecting symbols and colours to depict features on transparencies superimposed on geocoded and scaled maps or remote-sensed images. Additional information can be located on the map using GPS data gathered in the field. It can be used to diverse purposes as for example demarcating lands and areas where access to and control over natural resources are in dispute.
Potentials	If accurate (and affordable) topographic maps or satellite images are available, scale maps are quite effective tools. Field application is straightforward and engaging. These maps can be geo-referenced on GIS.

Limits	In some countries, access to accurate scale maps is regulated and difficult. Also, maps available can be not accurate or up-to-date. Sometimes satellite image are not readily available and expensive. It can be initially hard for people to interpret scale maps and the concept of scale. This is why facilitators need to support people in order to orient themselves on the map.
Participatory 3D modelling (P3DM)	P3DM integrates local knowledge with data on elevation of the land and depth of the sea to produce stand-alone, scaled and geo-referenced 3D models. Know-how is used by informants to depict land-use and other features on the model using push pins (for points), yarns (for lines) and paints (for polygons). Once the model is finished, a scaled and geo-referenced grid is applied to it to facilitate data extraction or importation. Data depicted on the model are extracted through digital photography, digitised and plotted. The model remains with the community after completion of the exercise. Derived maps are used to interact with remote parties.
Potentials	Models are very realistic, intuitive and easily understandable by people. The process of model-making is very rich in terms of involvement and very effective in capturing local knowledge. Also, the practice widely demonstrated to trigger behavioural changes and to enhance people's opportunities in building dialogue with authorities.
Limits	The digitization of models generally is finding several obstacles in its implementation due to the lack of local GIS expertise. When operated, the digitization is mainly done by experts located in project offices. Field-verification with communities after digitization hardly happens (even if included in P3DM theory) and this means that the digitization phase is not participatory. Moreover P3DM can be expensive in certain contexts particularly when materials for construction are not locally available. Using scale maps and satellite images as a base, this process can be constrained by the same issues of accessibility and affordability described for scale mapping.

Participatory Internet-based mapping & Volunteered Geographic Information	Participatory Internet-based mapping involves the use of web-based applications (e.g. Google Maps, Google Earth or Openstreetmap) to locate and present local spatial knowledge. These interactive maps allow users to click on map features to access other multimedia information. Map data are based on local knowledge that has been documented by community members using digital video, digital photos and written text. This information is usually stored on remote servers and managed and communicated through the interface of an interactive map. Volunteered Geographic Information refers to the sets of modalities and systems for gathering data and information coming from citizens, and which are based on Users-Generated Contents (UGC), Web 2.0 and the Geoweb through the use of Web GIS software (Ibid.). Through the use of Mobile Phones (SMS) or Smartphones with incorporated GPS, people can contribute to creating Collaborative Online Maps.
Strenghts	Good way to express, document and communicate knowledge. When possible, people can be trained with computer-based skills to use internet-based mapping tools quite easily. VGI have become particularly relevant in circumstances which need both speediness and breadth in the communication of geo-referenced data such as crisis situations, natural and humanitarian disasters. These methodologies are more applicable in developed world.
Limits	People do not manufacture collectively maps or models; they use Internet-based technologies to produce maps so 'Digital Divide' can be a relevant limitation to this practice particularly in certain contexts of developing countries. People produce maps that hardly can be used by professionals for planning. Costs for computers and for training people as well as long-term management of this mapping system can be problematic. Danger to focusing too much on the technology to the detriment of the participatory collective process. Few people can really participate as computers number is generally limited. Regarding VGI, even if it might be easier for people to participate through their mobile phones (which are quite diffused also in developing worlds) or smartphones, the practice is mainly based on individual contributions rather than collective; and generally it is

	focused on the act of inputting geo-coded data rather than entailing a process of collaborative hands-on mapping.
People Mapping + GIS (PM+GIS)	This practice ideated by the author as a result of this research work, entails two separate phases: the first of hands-on mapping in which people make maps (they can start with sketch mapping but then they need to produce scale maps) or models (through P3DM process). Making maps or models depending on the context and purpose of the mapping. In the second phase the maps or models collectively produced are digitized on GIS possibly by university local students in direct collaboration with locals, or by trained community members in order to make them storing managing and retrieving information when needed. After participatory digitization, GIS can be enriched with hyperlinks that connect to videos, photos and stories. The final derived map can be put online if needed. They embody the base to be used for any space transformation or management issue related to the area they represent.
Potentials	This integration of different tools can make the process collective, collaborative and truly participatory in every phase.
Limits	Making the digitization phase participatory can be time and cost consuming. Also the connection with local universities requires a pre-work for relationships building and organization not always practicable.

This analysis of different methods above is a personal re-elaboration which takes some inputs from the "Training Kit on Participatory Spatial Information Management and Communication" of Giacomo Rambaldi and the booklet "Good Practices on Participatory Mapping" of International Fund for Agricultural Development (IFAD).

The case of Cua Nam Ward's Block 6A

The following is an extract from ACCA reports 2010-2014 of ACHR. The community of Cua Nam Ward in Vinh hosted me and my colleague in their beautiful self-built new neighbourhood for six months. I lived in fact in the house of the community leader Mr Le Viet Hung with him and his family.

The 29 poor families in Cua Nam Ward's Block 6A were living in one of Vinh's crowded and dilapidated collective row-houses built for factory workers at the end of the war, in the 1970s, when the city was planned to become a new industrial centre. In 2007, the provincial authority announced plans to redevelop all of these areas by demolishing and replacing them with lower-density "social housing", with plots and houses of more than double the size. Many families would be relocated to newly housing development elsewhere. For both the in-situ and relocation parts, the redevelopment process was to be a conventional top-down, state-planned, contractor-built housing process with no participation of the communities and for which the people would be expected to pay for everything: land-use rights, infrastructure and expensive new houses built to a very high standard. The families in Cua Nam Ward were tightly-knit and wanted to stay, but they could never afford units in the new scheme. So they decided to propose to redevelop their housing themselves. The plans they developed, with help from the community architects network (CAN), included widening the lanes, laying drains and rebuilding their small houses in an efficient layout of 2-story row-houses on 45m2 plots. They used this redevelopment plan, and the availability of housing loans from ACCA, to negotiate with the city and provincial governments, which finally agreed to the people's proposal. The beautiful housing project that they built, in just six months, has set an important new precedent in Vietnam. This is the first case in the country where urban poor people living in collective housing have won the right to design and rebuild their own housing on the same site, with the support of both the municipal and provincial governments. And it was the first case of a collective housing community getting permission to build houses that are considerably smaller and more affordable than the provincial government's minimum social housing standards. This people's standard has now been officially sanctioned by the municipal government and this model is already being replicated in several other row-house type collective housing areas in Vinh, where the ACCA big project funds are already revolving through the CDF to finance housing loans in other projects, and in other cities as well like Hai Duong. The goal is ultimately to mainstream community-driven housing development in all Vietnam.

The case of Cua Nam is a very important case for ACCA program. All the 29 families got land plots in the same place where they lived and no one was forced to relocation. Households got less square metres than those they would have obtained through the government's plan, yet everyone could afford the construction of the new house and all of them stayed to live in the area instead of selling and moving elsewhere. People welcomed the collective saving and CDF system and managed to organize themselves as a community. A fundamental role was played by the

community leader who demonstrated great capacity in listening to people priorities and managing communication with government officials; as well as contributing to increasing solidarity and mutual help among members. Thanks to the voluntary workforce and community internal organization they managed to drastically reduce the costs for construction. Indeed, people reused materials from dismantling the old houses; they had only one contractor for everyone; they shared foundations and walls; they collectively purchased materials and supervised its effective uses. Moreover everyone had the same size plot and the leftover land was used for common purposes such as a badminton pitch where community members play every day after 5pm.

Apart from the monthly housing loan repayment of 20 million VND to Vinh City CDF, Cua Nam Saving Fund kept growing continuously and became a financial security for community members. The community strength contributed to leveraging government funds which financed part of the houses construction as well as international funds (besides ACCA's 40,000 USD that were devolved to CDF for the loans).

Very different was the evolution of ACCA program (which concluded in 2014) in the area of Hung Hoa Commune. As I already explained, mapping became a common tool of involvement in the communes of Vinh City particularly in relation to collaborative planning and natural resource management and this was certainly a success. However, at the time of writing the drainage in Hung Hoa has not been constructed yet and the flood still affects the area once a year. Some recent e-mail exchanges with a now retired government official from the Women Union highlighted that in the government prospective community leaders were not enough strong to mobilize communities and enough committed in saving collectively to get the low-interest CDF loan. From the community perspective instead people wanted the government to entirely finance the drainage work of construction.

It seems the government has recently allocated funds to this purpose but the starting of implementation is still unclear. To my view, it is true that saving groups were not very strong when we carried out the mapping process; however I reckon leaders of Hung Hoa were very committed and strongly bounded to their communities. An important reflection that perhaps should be made is the following: drainage is a public infrastructure and a public good, while housing is a private one. During the mapping process people were really keen on mapping the drainage and contribute in its planning and they were willing to volunteer in its physical

implementation, but they wanted the government to finance the drainage construction as they considered this kind of basic infrastructure as part of state's provision. It is more common to get involved, particularly in financial terms, when the stakes is the own private house. Yet, it is different when the goal is a public service.

TWO WAYS TO MAKE SOCIAL HOUSING IN VIETNAM :

The small project at Cua Nam Ward in Vinh has been an important breakthrough, because in cities all over Vietnam, municipal governments keen on modernizing their cities are now setting plans to demolish and redevelop their stock of run-down collective housing, which is seen as an eyesore. When the redevelopment is planned by the government and implemented by for-profit developers, as it usually is, it creates a "social housing" process which breaks up communities, evicts and impoverishes people and prevents the poorest from getting secure land and decent houses. Here are some eloquent figures from a study which compares the ACCA project at Cua Nam Ward with a more conventional collective housing redevelopment project by the government :

TOP-DOWN & INDIVIDUAL

The city does the redevelopment planning, contractors do the infrastructure and each family is left to design, build and finance its own house *(example of Block 7, Ben Thuy Ward, in Vinh)*

COMMUNITY-DRIVEN & COLLECTIVE

The community works together to design their own layout plan and then constructs the new houses and infrastructure together *(example of Block 6A, Cua Nam Ward, in Vinh)*

1	Numbers of families who got land plots in the same place	69 families out of 114 (60%)	29 families out of 29 (100%)
2	Number of families who were evicted and forced to relocate	45 families out of 114 (40%) (only 11 of these families got alternative land)	0 families
3	Average size of each family's house plot before and after redevelopment	Before : 28 square meters After : 89 square meters	Before : 30 square meters After : 47 square meters
4	Number of families using redeveloped land for non-housing purposes	23 families (33%)	0 families
5	Number of families who sold off their land rights and moved elsewhere	19 families (28%)	0 families
6	Number of families who could not afford to construct new houses	27 families (39%)	0 families (the community helped the one very poor family to build a simple one-story house)
7	Government compensation costs for families that were forced to relocate	$415 per family x 45 families = US$ 18,675	0 costs
8	Cost of dismantling old houses, filling land and allocating new plots	$395 per family	$103 per family
9	Cost of installing infrastructure facilities and basic services	$1,166 per family (done by contractors, covers only drainage, no paving or services)	$303 per family (done by people, includes drains, paving, electricity and water supply)
10	Cost of constructing the new houses	$141 per square meter (for a 2-story concrete frame house)	$72 per square meter (for a 2-story concrete frame house of about the same size)

Fig. 37 Two Vinh's wards Ben Thuy and Cua nam compared. The first was a government-led redevelopment, the second a community-driven one. *Source: ACHR Report December 2010.*

Participatory Evaluation of P3DM in Samoa

The following is a table compiled after the several community meetings that I and Annie Mauga, official at MNRE, organized during my research period in Western Samoa. There are people feedbacks on their involvement in P3DM practice.

Feedback on Participatory 3 Dimensional Modelling by 3 ICCRIFS Project Districts

Questions	Site 1 (Laulii - Falevao)	Site 2 (Lake Lanotoo)	Site 3 (Mauga-o-Salafai)
What was your involvement in the P3DM?	In the development of the model	In the development of the model	In the development of the model
What was your understanding in the beginning?	Understood that this model could enable long term environment planning	That the government and foreigners were planning to take over our community land That the project was about the creation of 2D maps of the villages	Members firstly questioned the motive of the process but eventually understood the importance of developing this model
Did you enjoy the process? How? What went particularly well and why?	Yes. I was excited to see the environment and landscape I reside on particularly the location of each river and natural resources Able to see areas that should not be developed in any way as it would have affect the environment in the long run	Yes. Enabled understanding of the village boundaries and flood prone areas Not in the beginning but enjoyed it towards the end of the process.	Yes, although it would have been extremely well if more members of community were invited to take part

The process is divided in phases. What do you think about this subdivision?	Understood that there were 3 subdivisions during the development process. From one subdivisions perspective, it was well divided as it was placed in logic and right order.	Not happy with this subdivision as it allows only limited understanding of entire process e.g. If I was to cut cardboards I will only do this until the end of the process	The process was well subdivided especially with the technical assistance of the team leading the process
What did you learn from the process?	Learnt that the upland areas has extensive forest cover Learnt that there are many water basins in upper areas Learnt how close some houses are to the flood prone areas The model confirmed the Baseline Ecological Survey as it affirms location of some resources that have been previously wrongly pointed out by community	Learnt a lot about surroundings and the impact of individual activities on natural resources such as water	Learnt a lot from the process particularly the location of natural resources and the village boundaries
After participating in P3DM process, do you know your environment better now? How?	Yes. For example before the development of the model members of community have been involved in logging operations or cutting down of trees and with the realization that the forests are starting to decrease, some members were then advised not to cut down trees at an extreme rate	Yes. Being involved in making this model enables us to feel ownership of our environment Disabled members of community are able to see areas they have never been to or known of before	Yes, we have learnt a lot about our surrounding environment

What kind of improvement you applied to your village and natural resource management?	Trees that are in the nurseries were distributed to community and were planted along the coast for soil retention against erosion, as well as in the upland some plants are being maintained and growing well e.g. the planting of Asi	A cattle farmer in the village was advised by members of the community to relocate his cattle farm from an area that enables cattle to cross the river Some land has been fenced to avoid animals going into the river waters More improvements will be implemented once digitized maps are available from the Ministry for community planning	We have implemented and continued development of the agro-forestry plots as was supported through the project
Do you think P3DM was useful? How? What opportunities you had from the process?	One important use was that our children in school are able to learn the importance of environmental issues and this is seen as an opportunity not available in every community in Samoa The ministry plays an important role in paving the way for community to work on such developments – capacity built and partnership between government and communities	Yes it was definitely useful. Important partnerships with government ministries and other villages within the district	The opportunity was the partnership with government ministries (Ministry of Agriculture, Ministry of Environment, Funding agencies). Now we understand the work of the division better, and this is useful to communicate with the ministry and ask or propose activities. We have a more direct relationship
Would you suggest P3DM to other communities? Why?	Yes, definitely	Yes, we were supposed to be 4 villages involved in the district and with one missing, we feel there is a gap in the management of district's environment	Yes it is strongly suggested. There are questions on why other villages from the district were not involved. Why did this happen?

If looking back would you do something differently? Would you like to give suggestions to improve the process?	There is no need for improvement as everything was seen to have gone well	Advise to have members of subdivisions rotating during the process	We suggest to arrange another opportunity for other members of the community to have second opinion on the model before digitizing it
How can we continue the process?	To have these models digitized in case the model falls apart	Digitized maps assist villages to manage better their environment e.g. show areas that are 'light green' on P3DM needing to be replanted particularly at water catchment areas. The model is not with us and we cannot check the areas on it.	To have the maps digitized and the model back to the village
How can the work you have done (P3DM) be useful for the future?	This model will be the main guide for community planning not only for managing natural resources but also for infrastructural developments like access roads	The model will be our base for community planning	The model will help community plan and better manage our environment in case of further developments
Do you have anything further to add?	Would like to see continuation of this project despite completion of UNDP funding in July	We would like to create other models one for each village and we would like to ask for financial assistance from the government for buying materials	We suggest other aspects to be added onto the model for instance there are tourism sites that should be named on the model and could be useful as a reference for tourism development

We Want to Map

Barbara Dovarch

People mapping is a creative and serious game
Local knowledge and everyday experience are needed to play
There are no losers or winners, but roles and positions
There are no leaders or teachers; everyone is both expert and learner
There are no hierarchies, the main rule is respect
Every voice can be widely expressed and carefully heard

We want to map to be on the map
To make visible our invisible slums
To get recognition of our rights and dignify our lives
To lobby for land titles and consolidate our settlements
To have a visual reference when we communicate, claim, contest, negotiate

We want to map to protect our territories
Through identifying vulnerabilities and potentials
We want to preserve our environmental resources
Cultural diversity and natural ecosystems
Indigenous structures and traditional customs

We want to map to save our planet
To provide holistic perspective for better strategies
To understand the effects of our own actions
To mitigate the impacts of disastrous events
Before Nature revolts one more time against irresponsible humans
We want to increase our awareness and resilience

We want to map to keep our identity
Prior to coping with any change or transformation in our neighbourhood
We want to make visible its apparently disordered logics
Telling the narrative that characterizes our physical and social contexts
The related sense of belonging and spontaneous place-making practices

We want to map to move around freely
We want to identify spaces where inventing to invent our intrepid games
We want to give a hand to our classmates [should it be plural?], while going to school by ourselves in busy mornings
We want to draw our routes, our signs, and even our bans
We want to be free and safe in our own cities

We want to map to reach communities and governments
To provide a catalyst for interaction and facilitate platforms of dialogue
To give space to conflict while finding possible solutions together
To discuss and make decision jointly
To easily represent our shared designs and plans

While making maps people deconstruct their reality to build a new knowledge
Diversity is revealed; aspirations unleashed and possible futures becomes visible
Looking from a bird's-eye view, bonds between natural features and cultural values emerge
A *jam mapping session* evolves, where the instruments are people's voices…
And the *musics* are pieces of Earth.

Barbara Dovarch, Planning, Managing and Empowering while Pursuing Change: Exploring the Integration of People Map-Making and Geographic Information Technologies, Dottorato in Architettura e Ambiente, Università di Sassari

Bibliography

Abbot, J., Cinderby, S., Snell, C. J., Forrester, J. M., Abbot, J., Robert, C., … Callosa-Tarr, J. (1998). Participatory GIS: oppurtunity or oxymoron? *PLA Notes*, *33*(October), 37–41.

Abbott, J. (2003). The use of GIS in informal settlement upgrading: its role and impact on the community and on local government. *Habitat International*, *27*(4), 575–593.

ACHR. 107 Citites in Asia - Second yearly report of ACCA (2010).

ACHR, A. C. for H. R. 215 Cities in Asia - ACCA, Fifht Year Report 23 (2014).

Albrechts, L. (2015). Ingredients for a more radical strategic spatial planning. *Environment and Planning B: Planning and Design*, *42*(3), 510–525.

Allen, A., Frediani, A., & Lambert, R. The heuristic of mapping urban environmental change. Paper presented at the London Mapping Seminar Development Planning Unit – UCL (2012).

Allen, A., Lambert, R., Apsan Frediani, A., & Ome, T. (2015). Can participatory mapping activate spatial and political practices? Mapping popular resistance and dwelling practices in Bogotá eastern hills. *Area*, *47*(3), 261–271.

Appadurai, A. (2004). The Capacity to Aspire: Culture and the Terms of Recognition. In *Culture and Public Action. Rao, Vijayendra and Michael Walton (ed).* Stanford, California: Stanford University Press.

Archer, D., Luansang, C., & Boonmahathanakorn, S. (2012). Facilitating community mapping and planning for citywide upgrading: the role of community architects. *Environment and Urbanization*, *24*(1), 115–129.

Boano, C., & Kelling, E. (2013). Toward an architecture of dissensus: Design politics in South-East Asia. *Footprint: Delft Architecture Theory Journal*, *7*(2), 41–61.

Boonyabancha, S., & Mitlin, D. (2012). Urban poverty reduction: learning by doing in Asia. *Environment and Urbanization*, *24*(2), 403–421.

Boudreau, J. A. (2007). Making new political spaces: Mobilizing spatial imaginaries, instrumentalizing spatial practices, and strategically using spatial tools. *Environment and Planning A*, *39*(11), 2593–2611.

Butcher, S., & Frediani, A. A. (2014). Insurgent citizenship practices: The case of Muungano wa Wanavijiji in Nairobi, Kenya. *CITY Analysis of Urban Trends, Culture, Theory, Policy, Action*, *18*(2), 119–133.

Cammarota, J., & Fine, M. (2008). *Revolutioning Education: Youth Participatory Action Research in Motion. Revolutionizing Education: Youth participatory action research in motion*. New York/London: Routledge - Taylor & Francis Gorup.

CAN. (2013). *Community Mapping for housing by people Handbook*. ACHR.

Carcellar, F. N., & Kerr, T. (2012). Assessing the ACCA programme: turning Asia's community upgrading initiatives into an open university. *Environment and Urbanization*, *24*(2), 513–529.

Chambers, R. (1994). The Origins and Practice of Participatory Rural Appraisal. *World Development*, *22*(7), 953–969.

Chambers, R. (2006). Participatory mapping and geographic information systems: whose map? Who is empowered and who disempowered? Who gains and who loses? *The Electronic Journal of Information Systems in Developing Countries*, *25*(2), 1–11.

Chiodelli, F. (2009). La cittadinanza secondo Henri Lefebvre: urbana, attiva, a matrice spaziale. *TERRITORIO*, *51*, 103–109.

Cinderby, S., Snell, C. J., & Forrester, J. M. (2014). Participatory GIS and its application in governance□: the example of air quality and the implications for noise pollution. *Local Environment□: The International Journal of Justice and Sustainability*, (November 2014), 37–41.

Cleaver, F. (1999). Paradoxes of participation: Questioning participatory approaches to development. *Journal of International Development*, *11*(4), 597–612.

Clifford, S. (1996). Places, People and Parish Maps. In *from place to PLACE: maps and Parish Maps; Sue Clifford & Angela King (eds)*. Common Ground.

Conradie, I., & Robeyns, I. (2013). Aspirations and Human Development Interventions. *Journal of Human Development and Capabilities*, *14*(4), 559–580.

Cooke, B., & Kothari, U. (2001). The Case for Participation as Tyranny. In *Participation: the New Tyranny* (pp. 1–14). London: Zed Books.

Corner, J. (1999). The agency of mapping: speculation, critique and invention. In *Mappings* (pp. 213–300).

Cornwall, A. (2004). Spaces for Transformation? Reflections on issues of Power and Difference in Participation in Development. In *Participation: from Tyranny to Transformation edited by S.Hickey and G.Mohan* (pp. 75–91). London: Zed Books.

Cornwall, A., & Gaventa, J. (2000). From users and choosers to makers and shapers - Repositioning participation in social policy. *IDS Bulletin*, *31*(4), 50–62.

Craig, W. J., Harris, T. M., & Weiner, D. (2002). *Community Participation and Geographical Information Systems*. CRC Press.

Cuthbert, A. R. (2007). Urban design: requiem for an era – review and critique of the last 50 years. *Urban Design International*, *12*(4), 177–223.

Dal Santo, R. Parabiago allo specchio (2010).

Del Casino, V. J., & Hanna, S. P. (2011). Beyond the "Binaries": A Methodological Intervention for Interrogating Maps as Representational Practices. In *The Map reader: Theories of Mapping Practice and Cartographic Representation* (p. 504). John Wiley & Sons.

Dikeç, M. (2012). Space as a mode of political thinking. *Geoforum*, *43*(4), 669–676.

Doodge, M., Kitchin, R., & Perkins, C. (2011). *The Map Reader: Theories of Mapping Practice and Cartographic Representation*. John Wiley & Sons.

Dovarch, B., Pasta, F., Shepherd, A., Brugman, J., & Kassam, Z. (2014). *Grounding Knowledge reflections on community-driven development in South East Asia*. Bangkok: ACHR/CAN/DPU of UCL.

Dunn, C. E. (2007). Participatory GIS□: a people's GIS□? *Progress in Human Geography; SAGE Publication*, *31*(616).

Forrester, J., & Cinderby, S. (2013). A Guide to using Community Mapping and Participatory-GIS, 20. Retrieved from: http://www.tweedforum.org/

Fox, J., Suryanata, K., Hershock, P., & Pramono, A. H. (2006). Mapping power: ironic effects of spatial information technology. *Participatory Learning and Action; IIED*.

Frediani, A. (2016). Re-imagining Participatory Design: Reflecting on the ASF-UK Change by Design Methodology. *Massachusetts Institute of Technology Design Issues:*, *Volume 32*(3).

Frediani, A., & Boano, C. (2012). Processes for Just Products: The Capability Space of Participatory Design. In *The Capability Approach, Technology and Design; Oosterlaken, I and Hoven, JVD, (eds.)*. Dordrecht: Springer.

Freire, P. (1970). *Pedagogia do oprimido*. New York: Herder & Herder.

Friedmann, J. (1999). Claiming Rights: Citizenship and the Spaces of Democracy. *Plurimondi*, (2), 287–303.

Friedmann, J. (2000). The good city: In defense of utopian thinking. *International Journal of Urban & Regional Research*, *24*(2), 460–472.

Friedmann, J. (2011). *Insurgencies: Essays in Planning Theory*. London and New york: Routledge.

Friedmann, Y. (1975). *Towards a scientific architecture*. Cambridge, Massachusetts: MIT Press.

Gaventa, J. (2004). Towards Participatory Governance: Assessing the Transformative Possibilities. In *Participation:From Tyranny to Tranformation?; Hickey S. & Mohan (eds)* (pp. 25–41). London: Zed Books.

Gaventa, J. (2006). Finding the Spaces for Change: A Power Analysis. *IDS Bulletin - Institute of Development Studies*, *37*(6). Retr. from: http://www.powercube.net

Giddens, A. (1976). *New Rules of Sociological Method*. London: Hutchinson.

Giddens, A. (1984). *The Costitution of Society : Outline of the Theory of Structuration*. Oxford: Polity Press.

Giddens, A. (1987). *Social Theory and Modern Sociology*. Cambridge: Polity Press.

GLTN, G. L. T. N.-U.-H. Innovative Urban Tenure in the Philippines - Summary Report (2012).

Grasseni, C. (2012). Community Mapping as Auto-Ethno-Cartography. In *in Sarah Pink Advances in Visual Methodology SAGE Research Methods*. Retrieved from: http://srmo.sagepub.com/view/advances-in-visual-methodology/n6.xml

Hamdi, N. (2004). *Small Change: About the Art of Practice and the Limits of Planning in Cities*. London: Earthscan Routledge.

Hamdi, N. (2011). Architecture, Improvisation and the Energy of Place. *RSA Design & Society*, 20. Retrieved from: http://architecture.brookes.ac.uk/

Hamdi, N. (2014). *The Spacemaker's Guide to Big Change: Design and Improvisation in Development Practice*. New York: Earthscan Routledge.

Harley, J. . (1989). Deconstructing the map. *Cartographica*, *26*(2), 1–20.

Harris, L. M., & Hazen, H. D. (2006). Power of maps: (Counter) Mapping for conservation. *Acme*, *4*(1), 99–130.

Harris, T., & Weiner, D. (1998). Empowerment, Marginalization, and "Community-integrated" GIS. *Cartography and Geographic Information Systems*, *25*(2), 67–76.

Harvey, D. (1996). *Justice, nature, and the geography of difference*. Blackwell Publishers.

Harvey, D. (2012). *Rebel Cities: From the Right to the City to the Urban Revolution*. London: Verso Books.

Hayward, C. R. (1998). De-Facing Power. *Polity - Palgrave Macmillan Journals*, *31*(1), 1–22.

Healey, P. (1997). *Collaborative Planning: Shaping Places in Fragmented Societies*. London: Macmillan.

Healey, P. (2003). Collaborative planning. *Planning Theory*, *2*(2), 101–123.

Hickey, S., & Mohan, G. (2004). *Participation--From Tyranny to Transformation?: Exploring New Approaches to Participation in Development*. Zed Books.

Holston, J. (1998). Spaces for insurgent citizenship. In *Making the Invisible Visible: A Multicultural Planning History; Leonie Sandercock (ed.)* (pp. 37–56). University of California Press.

Hooks, B. (1990). Choosing the margin as a space of radical openness. In *Yearnings: Race, gender and cultural politics* (pp. 203–209). South End Press Boston MA.

Huang, B. C., & Castanas, N. (2016). *CAN CO-CREATE : Exploring the co-creation of space with nature in community development*. Bangkok, Thailand: Asian Coalition for Housing Rights ACHR - Community Architect Network CAN.

Huchzermeyer, M., & Karam, A. (2007). *Informal Settlements: A Perpetual Challenge?* Juta and Company Ltd.

Krygier, J., & Wood, D. (2011). *Making Maps A Visual Guide to Map Design for GIS*. New York/London: The Guilford Press.

Lavigne Delville, P., Sellamna, N.-E., Mathieu, M., & (eds.). (2000). *Les enquêtes participatives en débat: Ambition, pratiques et enjeux*. Paris: Karthala GRET and ICRA.

Leach, M., Mearns, R., & Scoones, I. (1999). Environmental entitlements: Dynamics and institutions in community-based natural resource management. *World Development*, *27*(2), 225–247.

Lefebvre, H. (1991). *The Production of Space*. Oxford UK Cambridge USA: Blackwell.

Lemmen, C. The Social Tenure Domain Model The Social Tenure Domain Model Pro-Poor, Fig Report 18 (2013).

Leslie, K. (2006). *A Sense of Place*. West Sussex Country Council.

MacKinnon, D. (2010). Reconstructing scale: towards a new scalar politics. *Progress in Human Geography*, *35*(1), 21–36.

Madanipour, A. (1996). *Design of Urban Space: An inquiry into a socio-spatial process*. Chichester; Wiley.

McCall, M. (2006). Precision for whom? Mapping ambiguity and certainty in (Participatory) GIS. In *Mapping for change: practice, technologies and communication - Participatory Learning and Action - 54*. IIED - CTA.

McKinnon, J. (2005). Mobile interactive GIS: bringing indigenous knowledge and scientific information together. A narrative account. In *Participatory approaches for Sustainable Land Use in Southeast Asia edited by A. Neef* (pp. 217–231). Bangkok: White Lotus.

Miessen, M. (2011). *The Nightmare of Participation*. Sternberg Press.

Miraftab, F. (2009). Insurgent Planning: Situating Radical Planning in the Global South. *Planning Theory*, *8*(1), 32–50.

Mohan, G., & Stokke, K. (2000). Participatory Development and Empowerment : The Dangers of Localism. *Third World Quarterly*, *21*(2), 247–268.

Mosse, D. (1994). Authority, Gender and Knowledge: Theoretical Reflections on the Practice of Participatory Rural Appraisal. *Development and Change*, *25*(3), 497–526.

Muller, D., & Wode, B. (2003). *Methodology for Village Mapping Using Photomaps*. Song Da, Vietnam: Social Forestry Development Project (SFDP).

Neef, A. (2003). Participatory approaches underder scrutiny: will they have a future? *Quarterly Journal of International Agriculture*, *42*(4), 489–497.

Paba (ed.), G. (2002). *Insurgent City. Storie e geografie di un'altra Firenze*. Livorno: Media Print.

Paba, G. (2003). *Movimenti urbani. Pratiche di costruzione sociale della città*. Milano: Franco Angeli.

Patel, S., & Baptist, C. (2012). Editorial: Documenting by the undocumented. *Environment and Urbanization*, *24*(1), 3–12.

Peluso, N. L. (1995). Whose woods are these? Counter-mapping forest territories in Kalimantan, Indonesia. *Antipode*, *27*(4), 383–406.

Purcell, M. (2003). Citizenship and the Right to the Global City. *International Journal of Urban and Regional Research*, *27*(3), 564–590.

Purcell, M. (2013). The right to the city the struggle for democracy in the urban public realm. *Policy & Politics*, *43*(3), 311–327 Policy Press.

Rambaldi, G. (2010). *Participatory Three Dimensional Modelling : Guiding Principles and Applications* (CTA). Wageningen.

Rambaldi, G., & Callosa-Tarr, J. (n.d.). Participatory 3–D Modelling: Bridging the GAP between Communities and GIS Technology. In *Workshop: Participatory Technology Development and Local Knowledge for Sustainable Land Use in Southeast Asia* (pp. 1–9). Chiang Mai, Thailand.

Rambaldi, G., McCall, M., Weiner, D., & Kwaku Kyem, P. A. (2006). Participatory Spatial Information Management and Communication in Developing Countries.

The Electronic Journal on Information Systems in Developing Countries EJISDC, (25), 1–9.

Sandercock (ed.), L. (1998). *Making the Invisible Visible: A Multicultural Planning History*. (L. Sandercock, Ed.) (Sandercock). Berkeley: University of California Press.

Sandercock, L. (1999). Translations: From Insurgent Planning Practices to Radical Planning Discourses. *Plurimondi*, (2), 37–46.

Sassen, S. (2000, June 1). The Global City: Strategic Site/New Frontier. *American Studies*.

Schneider, T., & Till, J. (2009). Beyond discourse: Notes on spatial agency. *Footprint*, (4), 97–111.

Schuurman, N. (2000). Trouble in the heartland: GIS and its critics in the 1990s. *Progress in Human Geography*, *24*(4), 569–590.

Sheppard, E. (1995). GIS and Society: Towards a Research Agenda. *Cartography and Geographic Information Science*, *22*(1), 5–16.

Sieber, R. E. (2004). Rewiring for a GIS/2. *Cartographica*, *39*, 25–39.

Slim, H. (1996). Practical Wisdom and the Education of today's relief worker. In *Educating for Real: The Training of Professionals for Development Practice*. Rugby: Intermediate Technology Publication - Practical Action Publishing.

Sliuzas, R. (2003). Opportunities for enhancing communication in settlement upgrading with geographic information technology-based support tools. *Habitat International*, *27*(4), 613–628.

Soja, E. W. (1996). *Thirdspace: Journeys to Los Angeles and Other Real-and-Imagined Places*. Oxford UK: Blackwell.

Sturgis, S. (2015). Kids in India Are Sparking Urban Planning Changes by Mapping Slums. *From the Atlantic CITYLAB*. Retrieved from: http://www.citylab.com/

Townsend, A. (2013). *Smart Cities: Big Data, Civic Hackers and the Quest for A New Utopia*. New York/London: W.W. Norton & Co.

Turnbull, D. (1989). *Maps are territories: Science is an Atlas*. Australia: Deakin University Press.

Veronesi, M., Hirst, L., & Mamo, J. (2016). *Grounded planning. People-centred urban development practices in the Philippines*. Bangkok, Thailand: ACHR/CAN/DPU of UCL.

Verplanke, J., McCall, M. K., Uberhuaga, C., Rambaldi, G., & Haklay, M. (2016). A Shared Perspective for PGIS and VGI. *The Cartographic Journal*, *7041*(September), 1–10.

Williams, G. (2004). Towards a repoliticization of participatory development: political capabilities and spaces of empowerment. In *Participation--From Tyranny to Transformation?: Exploring New Approaches to Participation in Development. S.Hickey, G.Mohan eds.* (pp. 92–107). London and New york: Zed Books.

Wood, D. (1992). *The Power of Maps* (The Guilfo). New York/London.

Wood, D. (2010). Rethinking the Power of Maps.

Wratten, E. (1995). Conceptualizing urban poverty. *Environment and Urbanization*, *7*(1), 11–38.

Zorc, D. (1977). The Bisayan Dialects of the Philippines: Subgrouping and Reconstruction. In *Pacific Linguistics* (Vol. C.44). Canberra: The Australian National University.

Webography

-A-EMP ANTI EVICTION MAPPING PROJECT website:

http://www.antievictionmap.com/

-Collymore Yvette (2003) online article on Philippines:

http://www.prb.org/Publications/Articles/2003/RapidPopulationGrowthCrowdedCitiesPresentChallengesinthePhilippines.aspx

-CROWDMAPPING MIRAFIORI SUD

http://areeweb.polito.it/mapmirafiorisud/

-MISSING MAPS website:

http://www.missingmaps.org/

- SHELTER ASSOCIATE website:

http://shelter-associates.org/

- Humara Bachpan:

http://www.citylab.com/tech/2015/02/kids-are-sparking-urban-planning-changes-by-mapping-their-slums/385636/